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INCOMPATIBILITY OF SULPHATE OF QUINIA WITH THE ACETATES.

By John M. Maisch.

In pharmaceutical works we generally find among the incompatibles with sulphate of quinine, the alkalies, their carbonates, the alkaline earths, tannin, &c., which act by either separating that alkaloid from its acid, or, recombining therewith, forming an insoluble salt; nothing is said about acetic salts.

The acetates of the alkalies are valuable diaphoretics and diuretics, and therefore are much esteemed for their activity in febrile diseases, particularly the acetate of ammonia, in the form of spiritus Mindereri is extensively used. It was a short time ago that a friend of mine received a prescription calling for a solution of 12 grs. of sulphate of quinine in 1 oz. of water with 1 oz. of liq. ammon. acet., which unsuspiciously was put up, but subsequently returned by the physician, the solution having deposited many crystals in the form of prisms. It is obvious that ammonia, which is the stronger base, must unite with the strongest acid, forming sulphate of ammonia and acetate of quinine, the latter of which, being nearly insoluble in water, is precipitated.

After repeating the same, I determined to make some other experiments, with a view to ascertain the peculiarities of this acetate of quinine, which has heretofore been little noticed, it seems, and the results which I have obtained may probably be of some use for further investigation.

When 6 grs. sulphate of quinine, by the aid of sulphuric acid, are dissolved in ½ oz. water, and this solution is mixed with liquid acetate of potassa (10 grs. in 1 dr. water,) the precipitate thrown down is curdy, consisting of minute crystals, and so voluminous that it does not drop out of the glass if it be turned upside down.

The solution of acetate of ammonia contains about 6 per cent.

of that salt, making about 14 grs. in ½ oz. of the solution. The equivalent weight of acetate of potassa is nearly one half as large again as that of the ammoniacal salt; 14 grs. of the latter would suffice to convert about 37 grs. of disulphate of quinine into the acetate, whilst 10 grs. of the former could not decompose over 19 grs. of the quinine salt. Still ½ oz of spir. Mind. decomposes 6 grs. of sulphate of quinine into a deposit of rapidly forming prismatic crystals, which are not near so voluminous as those formed by the potassa salt.

Again, if dilute acetic acid be neutralized by magnesia, ½ oz. of that solution precipitates the above solution of quinine partly in needles, combined to stars of a silky appearance, which also appear on the mixture of a solution of acetate of zinc.

The crystals of acetate of quinine form more beautifully, though also more slowly, in the solution of sulphate of quinine in diluted muriatic acid. I have obtained them in beautiful groups of feathery, tree, or fan-like appearance. I have satisfied myself that these precipitates consist of pure acetate of quinine; those formed by the potassa and zinc salt were charred in a porcelain vessel over the spirit lamp, destroying the quinine salt; the residue did not effervesce with acids, neither water nor acid took up anything by boiling; therefore nothing inorganic was contained in the salt.

Sometimes the crystals are at first transparent, but become opaque after being left under the liquid for a while; they do not dissolve, or only very little in cold water, and in the cold solutions of acetate of ammonia, potassa and soda, but they all retain a larger portion in solution after they have been boiled with the acetate of quinine. Chloride of ammonium seems to dissolve a larger portion of it, for when a solution of sulphate of quinine is mixed with a strong solution of sal ammoniac, the precipitate occasioned by acetate of potassa is less in quantity, at all events it does not stiffen the mixture, as is the case if that addition is not made.

To repeat these experiments, it is necessary not to add any more of the acid than is exactly required for dissolving the sulphate of quinine; an excess of acid decomposes the newly formed acetate of quinine, a part of which, or all, goes in solution again as sulphate or muriate of quinine.

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The same experiments may be made with muriate of quinine, on dissolving it in dilute muriatic acid; in this case the crystals generally appear slowly.

For medical use none of the salts of quinine can be used in mixtures together with any of the acetates. But should such a combination be desirable, it may be done by dissolving the *pure alkaloid* or the *acetate of quinine* in acetic acid, which then will be compatible with any of the soluble acetates, as well as with the chlorides and sulphates of the alkalies and alkaline earths.

Although the mixture of solutions of sulphate of cinchonine and the acetates of the alkalies does not produce any precipitate, still it would be injudicious perhaps to prescribe such a one, as they also decompose each other, forming a soluble acetate of cinchonine and sulphate of the alkali, the quantity of which will be increased by the acid necessary for obtaining the solution of the sulphate of cinchonine. Also in this case it would be advisable to produce first a solution of acetate of cinchonine.

Philadelphia, January 1855.

ON THE CULTURE AND MANUFACTURE OF CASTOR OIL IN ILLINOIS AND ST. LOUIS.

By William Procter Jr.

About the middle of last year, the Editor of this Journal, desirous of learning something more definite in regard to the castor oil manufacture and trade than was to be obtained from mercantile sources, addressed a letter to Mr. Guilford T. Chamberlain, Pharmaceutist of St. Louis, requesting the fullest information his favorable position would enable him to procure, both as regarded the culture of the ricinus in Illinois, and the manufacture of the oil there and in St Louis, which has been responded to in a letter recently received, from which the following facts relating to the subject as regards St. Louis and Illinois have been derived.

Southern Illinois is the source from whence all the beans are brought that are sold or manufactured in St. Louis. The ground is prepared as for other crops, and when there is no longer any danger from the Spring frosts, the seeds are planted in hills and rows, much in the manner of planting Indian corn, with the ex-

ception that there is but one seed put into each hill, and that at every fourth row a space is left sufficiently wide to admit of the passage of a team for the purpose of gathering the crop. Unlike the cereal grains the ricinus bears at the same time flowers and fruit, and the severity of our climate, which renders it in this latitude an annual plant, destroys its vitality whilst yet decked with bloom. The ripening commences in August, and the crop is gathered at intervals from this date till the plants are destroyed by the frost.

The yield of course varies with the quality of the soil, and the care of the culture. Twenty-five bushels from an acre of ground is considered a very large crop, and is but seldom obtained. From sixteen to twenty bushels per acre is a very fair yield in a season not marked by drought or other unfavorable feature.

In regard to the manufacture of castor oil, (says Mr. Chamberlain,) I cannot do better than to give you the following statement which was kindly furnished by the proprietor of one of the oil mills in St. Louis. "The primitive mode of making castor oil was by putting the [bruised] beans in a bag and placing the same in a kettle of water, and as the beans were boiled, the oil came to the surface and was skimmed off. Subsequently, there was adopted the screw and lever presses, and other devices for pressing the beans, and many mills sprang up throughout the southern portion of Illinois, some of which remain in use until this time. The beans are first kiln-dried, and then pressed without grinding, the oil thus obtained being called "cold pressed," to distinguish it from the boiled oil, (that obtained by boiling the beans in water).

About nine years ago, Mr. Henry T. Blow commenced using the ordinary hydraulic press in its manufacture, increasing the yield from the raw material, and working the beans with greater rapidity and economy. About two years since, Mr. Latourette introduced a new press of his own invention, which was patented October 28th, 1851, which has brought the business to a greater state of perfection by increasing the product of oil from the bean 37½ per cent. over the ordinary hydraulic press, and securing other advantages, such as saving of labor and fuel. One of these presses will work 150,000 bushels of beans per annum,

producing as much as 400,000 gallons of oil. It is said that one of these presses worked on castor oil, in connection with others on linseed oil, furnishes sufficient combustible refuse from the castor bean to supply fuel for the works; and in this way the fuel from the bean is of sufficient value to pay all the expenses of manufacturing the oil. The amount saved in Latourette's establishment, by burning the above refuse, when in full operation, is about fifty dollars per week.

After the oil is pressed from the beans it is clarified by boiling in large kettles with a small portion of water, and when perfectly clear is allowed to cool, and is then drawn off into barrels ready for market. During the months of July, August, and September 1854, there were manufactured thirty-two thousand gallons of castor oil at this establishment alone."

Mr. Chamberlain obtained the following statistical view of the castor oil production from another establishment which shows that the manufacture of the oil, which in 1850 was largely carried on in Illinois, is now mostly effected in the city of St Louis.

Year.	Crop in bushels.	Factories in Illinois.	Factories in St Louis.	Barrels of oil made.	Equivalent in gallons.
1850	250,000	18	2	9,900	350,000
1851	160,000	7	2	7,000	255,000
1852	90,000	5	2	5,500	192,500
1853	65,000	3	3	4,200	147,000

The estimated crop of beans for 1854 is but 10,000 bushels, being almost a total failure, arising from the excessive drouth that prevailed during the past summer over that part of the country. The number of mills in operation in 1854 was but five, and they only employed part of the time.

The above statements exhibit a gradual decline in the amount of oil produced which arises partially from the deceased crops, and partly, probably, from a limitation in the demand. The price of oil in 1852 and 3 was as low as 60 to 80 cents per gallon, and is at present up to $1.25, if not higher, by the barrel, which, with the short crop of the past year, will probably raise yet higher, so as to prove an inducement to the farmers to again turn their attention to raising the beans. We saw it stated in the newspapers that castor oil had been used on one of the west-

ern rail roads for oiling the axles of cars, and probably also on the locomotives. Since the rise in the price of whale oil, the attention of machinists has been turned to various substitutes, and it is probable that the non-drying quality of castor oil, when pure, will render it very valuable for lubricating purposes, if it can be produced at a sufficiently low price.

The chemistry of castor oil is exceedingly interesting since the researches of M. Bouis (Am. Jour. Pharm. vol. xxvi, 414,) and others, proving it to be capable of yielding a fourth of its weight of sebacic acid by distillation with potash, which it has been suggested may be applied to illuminating purposes like spermaceti and stearic acid. The variableness of castor oil in quality, as regards color, odor, and taste, may easily be accounted for by reference to the preceding statements of the mode of manufacture. The object of kiln-drying the beans, is to free them from moisture, and by thus toughening the albuminous tissues, to render them less liable to pass out in an emulsive form, with the oil. It may be, also, that this heating, when it immediately precedes the expression, greatly facilitates the flow of the oil by increasing its liquidity.

Pure castor oil, according to Lowig, consists, proximately, of ricinin and palmitin, two neutral fatty substances. The last is bland, and is identical with one of the fats in palm oil; whilst the ricinin is less bland, and by saponification, or by excessive heat, yields ricinic acid, an exceedingly acrid substance, which is the chief cause of the increased activity of old rancid castor oil. Now it is not improbable, that occasionally the excessive application of heat may partially act on this ingredient of the oil, either in the preliminary process of drying, or in the subsequent steps of boiling the oil with a little water till the moisture is driven off. Another cause of inferiority in oil, may be the occasional use of old beans. There is much yet to be learned in reference to the proximate chemistry of castor oil beans. Mr. Henry A. Bower, (Amer. Jour. Pharm., vol. xxvi, page 207) has shown that the albumen of the seeds are analogous to, if not identical with, the emulsin of almonds;—also that the peculiar nauseous odor which is developed when the seeds are triturated with water, is probably due to a substance that does not pre-exist

in the seeds, but like oil of bitter almonds is generated by the reaction of the emulsin on some principle not yet isolated. The question at once suggests itself, whether the well known activity of the residue after the expression of the oil, which is such that the amount of it in two or three seeds produces cathartic effects equivalent to an ounce of castor oil, is due to this hypothetical substance, developed by contact of moisture? or whether it could be traced to a pre-existent, well defined principle, of extreme acrimony, capable, in the diluted state in which it must exist in the residue, of producing the effect indicated? And finally, if such a principle exists, whether it is soluble to any extent in the expressed oil, and contributes to its cathartic power? The statement of Dr. Wood, (U. S. Disp.,) that the ebullition of the oil with water removes an acrimony at first possesses, seems to suggest the latter view as correct. These inquiries are worthy of the attention of pharmaceutical chemists.

ON THE TINCTURE OF CHLORIDE OF IRON.

By A. P. Sharp, of Baltimore.

I have frequently been at a loss to know how to make the above preparation of the required strength of the U. S. Pharmacopœia, from the fact of the impossibility (at least as far as my experience has gone) of obtaining the acid of the proper specific gravity, 1160, which is necessary to dissolve all the iron.

I have tried different plans, and have gone to considerable expense to get the acid of 1160, and even after obtaining it of that specific gravity, have found it would not answer the purpose, and upon investigating the cause of it, have always found that the acid was brought to the above specific gravity by the adulteration of sulphuric acid, either intentionally or accidentally. I propose a simple plan whereby every pharmaceutist may always obtain the tincture of the proper strength and with very little trouble, which plan I prefer to any other I have tried. I comply with the directions of the U. S. Pharmacopœia, using the pure muriatic acid, until I am satisfied no more iron will be taken up. I then fit a cork and bent glass tube to an ordinary Florence flask, partly filled with commercial muriatic acid, and after properly

adjusting the tube in the solution (acid and iron) contained in a porcelain dish, apply the heat of a spirit lamp to the flask, and and in a few minutes, the muriatic acid gas* passing off into the solution, dissolves the remaining iron, and gives a beautiful clear solution; which, even upon the addition of the alcohol, renders the filtering of it entirely unnecessary, unless the iron should contain some insoluble impurity.

Tincture of chloride of iron prepared as above, has a specific gravity of 1010, and yields thirty five grains of per-oxide of iron to the fluid ounce.

I find, upon inquiry among some of our best pharmaceutists, that they all have experienced the same difficulty in not being able to dissolve the iron; and I therefore, have submitted this simple plan, hoping it may be deemed worthy of an insertion in your useful and interesting journal.

January, 1855.

SYRUPUS FERRI PHOSPHATIS.

By T. S. Wiegand.

The experience of many physicians having accorded to the phosphates decided remedial powers, it was presumed that a formula, which would exhibit them in a scientific manner, would be acceptable to most of the readers of this journal. The following formula has been used quite freely by the writer, and with such satisfactory results (pharmaceutically only, of course, I can speak of) that I offer it with confidence to the notice of our profession.

℞.	Ferri Sulph. Cryst.	grs. 500
	Sodæ Phos. do.	grs. 1300
	Acidi Chlorohydrici	f℥iv.
	Sacchari	℥vii.
	Aquæ	q. s.

Dissolve the phosphate of soda in two pints of water, filter if necessary; then make a solution of the ferruginous salt, add the phosphate of soda to the iron solution as long as it occasions a precipitate, which should be washed with recently boiled cold

*Muriatic acid losing its gas by heat until the specific gravity is reduced to about 1095.

water, and when free from saline contamination should be dissolved by means of the acid and filtered. To the solution add the sugar in coarse powder, and make up the measure by means of distilled water to twelve and a half fluid ounces.

Syr. Ferri et Calcis Phosphatis.

This preparation is made by manipulating exactly as in the foregoing case, and adding to the solution of the phosphate of iron all of the magma of phosphate of lime resulting from the decomposition of the sixty-five grains of chloride of calcium by means of seven drachms of crystallized phosphate of soda, after it has been well washed. There is no more acid necessary in this case than the former, and the preparation may be used in the same doses.

ON THE VOLATILE OIL OF ERIGERON PHILADELPHICUM.

By the Editor.

In the twenty-sixth volume of this Journal the Editor called attention to the volatile oil of Erigeron Canadense, a new therapeutic agent brought into use by the Eclectic practitioners, and which occurs in commerce labelled "Oil of Erigeron," the specific name of the plant not being named. On a recent visit to the establishment of Mr. Frederick L. John, of this city, he called our attention to a small vial of the oil of Erigeron Philadelphicum, and expressed his doubts as to the genuineness of the commercial oil of Erigeron, owing to its difference in odor and color from his specimen. Mr. John, not being aware which plant yielded the oil, took occasion last summer to have collected a quantity of the species mostly employed by physicians here, the E. Philadelphicum; and in January last, he submitted the dried herb to distillation with water, and was not a little surprised at its small yield. He charged the still with 17 lbs. of the plant, and a due proportion of water, and on its exhaustion returned the distilled water to two fresh additions, thus treating forty-five pounds of the herb, from which with his utmost care he was able to collect but half a drachm of volatile oil. This he very politely requested us to accept, which we did, on condition of giving a notice of it here. This oil has a greenish yellow color, powerful, penetrating, aro-

matic and somewhat herbaceous odor, suggesting that of the bruised plant, and a bitterish, pungent, disagreeable taste; its consistence is much more viscid than the oil of E. Canadense, and its taste much more decided. Its specific gravity, ascertained by carefully weighing a buck-shot whilst suspended in the oil, with a delicate balance, is .946, whilst that of the E. Canadense is .845 to .850. It is evidently more oxygenized than the last named, as potassium rapidly decomposes it, and it is probably much more soluble in water.

It is evidently a different oil from the commercial oil of Erigeron. The fact of E. Philadelphicum not being productive in oil has been noticed by others. In the Eclectic Dispensatory (page 452) it is stated that this plant "yields on distillation a pale yellow acid styptic volatile oil, resembling that of E. Canadense." This is either a mistake, or the difference in the results must have arisen from distilling the oil there described from the plants freshly gathered, which may occasion the difference, especially as the flowers in which the oil chiefly reside are, like most of the compositeæ, favorable to the dissipation of the oil.

GLEANINGS—CHEMICAL, PHARMACEUTICAL AND MEDICAL.

Manufacture of Alcohol from Wood.—M. J. Nickles, in his correspondence in Silliman's Journal for January, remarks that the increased price of wine, occasioned by the grape disease, and the partial prohibition of the use of cereal grains, has directed the attention of manufacturers of alcohol to other sources, and beet juice, Indian corn, couch grass, and asphodel have been employed experimentally. Recently, M. Arnoult has sought the sugar derived from wood by the action of sulphuric acid, as a source of alcohol. He has succeeded in obtaining 70 to 80 per cent. of sugar from poplar wood. The wood is reduced to coarse saw-dust, dried at 212° F., and after cooling it is moistened with sulphuric acid by gradual additions, so that the mass shall not become heated, until 110 parts have been added for each 100 parts of dried wood. After reposing twelve hours, the apparently dry mass is triturated until it becomes quite liquid. This is diluted with water, boiled, the acid saturated with chalk, and the liquor

filtered from the sulphate of lime is fermented and distilled in the usual manner. The author hopes to be able to diminish the proportion of acid, and thus render the process more economical.

French enterprise in Algeria.—In the correspondence above quoted, there is an interesting account of the products raised in Algeria under French encouragement. In 1853, nearly 30,000 lbs. of silk cocoons were produced in one department, and the plantations of the mulberry are extending. Madder is being raised profitably. The cochineal culture appears to be no longer doubtful, as 29 cactus plantations are in operation. The best varieties of cotton are being cultivated with great success, the cotton of Algiers having received 11 prizes at the London Exhibition. The olive tree in Algeria attains the height of a forest tree, and in the district of Kabylia it is very abundant. Since 1852, the oil trade has greatly increased, owing to the pains that have been taken to introduce the art of grafting among the natives, and in the establishment of well managed oil factories among the mountains. The product of oil exported in 1853, amounted to about six millions of pounds. The course pursued by the French government in fostering the productions of this colony, must eventually render it of great value, however costly at present.

Effects of pressure on the fusing point.—Mr. Hopkins, (Proc. Brit. Assoc.) has been making some experiments on the fusing points of several substances under great pressure, which has afforded with four of them, the following results exhibited in tabular form in Silliman's Journal.

Substances.	Pressure in lbs. to square inch.			Temperature (Fahr.) of fusion.		
Spermaceti,	0	7790	11,880	124°	140°	176.5
Wax,	0	7790	11,880	148.5	166.5	176.5
Sulphur,	0	7790	11,880	225	275.5	285
Sterine,	0	7790	11,880	158	155	165

As it was impossible to use glass for the containing vessel so as to witness the process, a very ingenious contrivance was resorted to determine when fusion occurred. A ball of iron was placed on the top of the substance under pressure, which deflected a small magnetic needle above it outside, but as soon as the substance melted, the ball fell, and the needle returned to its proper position.

Sulphate of Quinidine in Intermittent Fever.—Dr. J. S. Dorsey Cullen, one of the Assistant Physicians at the Philadelphia Hospital, reports in Hay's Journal for January, 180 cases of intermittents treated with sulphate of quinidia. The patients were mostly Irish and German laborers; in nearly every case a purgative was administered before commencing with the quinidine; the dose was generally three grains every hour for five hours preceding the period for the recurrence of the chill. Of the 180 cases, 111 were of the quotidian type, 35 of the tertian, and 31 tertain and quotidian. In 129 cases, the chill was averted by 15 grains of the salt, without a return of it. After the arrest of the chill, the patients, in every instance, took an infusion made of serpentaria, gentian and cinchona, with citrate of iron. Dr. Cullen is so well convinced of the efficacy of sulphate of quinidia, that he employs it instead of the quinia salt for the uses stated, as its lower price makes it an object in the economy of the hospital.

New Hæmostatic.—M. Hannon, of Belgium, believes the following composition to possess powerful hæmostatic properties superior to any other known, whether applied locally or taken internally, viz:—Take of benzoic acid 1 part, alum 3 parts, ergotine 3 parts, water 20 parts, boil them together for thirty minutes in a porcelain capsule, constantly stirring the mass and replacing the evaporated moisture. Finally, it is concentrated to the consistence of an extract, with constant stirring to prevent the separation of the benzoic acid by crystallization, and when finished, has a brown color and strong astringent taste.

It is applied externally in the form of a plaster over the seat of the hemorrhage. For its internal use, as in hæmoptysis, it is sufficient to make up the ingredients mixed together directly into pills, thus: powdered benzoic acid 15 grs., powdered alum and ergotine, of each 45 grs., mix and form into 16 pills, one of which is to be given every two hours.—*Hays' Journal.*

Thein and Caffein.—Prof. Albers having made a series of experiments on frogs and rabbits with the citrates of caffein and thein, has arrived at the following results in reference to their physiological action.

1st. Both are capable of producing tetanic rigidity in frogs,

as completely as does strychnia, one grain introduced below the skin being sufficient.

2d. They affect the heart equally with the external parts.

3d. They each cause contraction of the heart, which distinguishes their action from that of other narcotic alkaloids, and they act more violently on cold than on warm blooded animals. Caffein produces the same effects when introduced directly into the circulation as when taken into the stomach. The effects of caffein on the human system is that of a powerful sedative and anodyne, especially applicable to neuralgic headache. The dose, in such cases, is 2 grains.—*Hays' Journal.*

Opium fumes for Coryza.—Dr. Lombard states that the severe pain in the nose and frontal sinuses which often attend coryza, (or cold in the head,) is relieved with great success by the fumes of partially burned opium. The patient each time places a grain and a half or two grains of powdered opium on a piece of sheet iron held over a lamp, and inhales the fumes through the nose till relieved.—*Brit. & For. Rev.*

Manner of odorizing Wines in Greece.—To communicate a most exquisite aromatic taste and odor to wine, in Greece, wine makers are in the habit of putting the flowers of the grape-vine in the must before its final fermentation.

The flowers are gathered at night after a hot day when they evolve the greatest odor. The stalks are struck with a stick, and the flowers received on a plate as they fall, thrown into baskets, and then spread on linen in thin layers to dry in the shade. When dry, they are put into glass or earthen jars, pressed even, hermetically sealed and kept in a cool place till they are required for use.

In using them about 100 pints of clear new wine is put into a small cask, and a pound of the flowers contained in long, slim, thin muslin sacks are suspended in the casks, which are then carefully bunged, furnished with a recurved tube passing the bung, and placed in the cellar to ferment, after which the flowers are withdrawn and the wine racked off into another cask, which should be entirely filled. After again racking, the operation is terminated, and the wine thus prepared is used as a kind of *boquet* essence to give to other wines the odor it possesses.

The quantity to be used depends on the taste of the operators—*Jour. de Pharm., Dec.* 1854.

Process for revivifying Animal Charcoal, by M. Pelouze.—This process is founded on the property that caustic and carbonated alkalies possess of dissolving the coloring matters contained in animal carbon that has been used in the manufacture of sugar.

The charcoal, more or less saturated with coloring matters, that are not taken up by either lime or acids, abandons them with great facility when treated with water, containing a few hundredths of its weight of caustic soda or potassa, or of their carbonates. The liquid is colored yellow, and the charcoal regains its decolorizing properties.

It is necessary to wash the charcoal thus treated with great care, first with boiling water, and then with water slightly acidulated, so as to leave no traces of the alkali or alkaline salt, the presence of which greatly weakens the decolorizing power. In those cases where the charcoal contains a large quantity of lime or carbonate of lime, it is necessary to augment the proportion of the acid in the wash water.

The alkali can be regained from the wash waters by evaporation, if desirable.—*Jour. de Pharm., Dec.* 1854.

Propylammine in the flowers of Cratægus oxycantha.—The natural odor of these flowers recalls that of putrid fish, and is very persistent. M. Wicke, by distilling the flowers with a dilute soda lye, obtained an alkaline distilled water strongly charged with the peculiar odor alluded to, which he saturated with hydrochloric acid and evaporated to dryness. The saline residue, treated with ethereal alcohol, yielded a solution affording a yellow precipitate with chloride of platinum, which he found to be chloride of platinum and propylammine. The buds contain more than the flowers. Wittstein had previously detected this alkaloid (which is the same that gives the herring pickle its peculiar odor) in the flowers of the *Pyrus communis, Sorbus aucuparia, and Cratægus monogyna.—Ibid.*

New variety of Silk Worm from India.—M. Milne Edwards lately stated to the Academy that the *Bombyx cynthia*, a a new variety of the silk worm, which feeds on the leaves of the castor oil plant (Ricinus communis) had recently been imported from India into France. The silk it produces is inferior to the

mulberry bombyx in fineness, but is remarkably strong, and is used habitually in India by the poorer classes.

The worm is very productive; it grows so rapidly that six or seven crops are obtained annually, and the plant on which it feeds is easily cultivated. It is proposed to cultivate it in the south of France and in Algeria.

Substitute for Quinine.—A physician at Martinique has discovered a tree, the bark of which affords an alkaloid as valuable as quinine in curing fevers. The subject is under consideration of the French government.—*Lancet, Jan.*, 1855, *and Med. News.*

Aldehyde in Vinegar, distilled Vinegar, Wine and Brandy.—M. Lahens, pharmacien of Toulouse, (Journ. de Pharm. Janv. 1855,) in experimenting on the presence of glucose with Barreswil's test was led to examine into the cause of a reaction that puzzled him, which led the detection of aldehyde in several liquids. His conclusions are,

1. That wine, brandy, vinegar, and distilled vinegar contain aldehyde.

2. That the aldehyde in brandy and distilled vinegar are derived from the fermented liquids from which they are distilled.

3. That crystallizable acetic acid, pyroligneous acid and alcohol of 36° do not contain aldehyde, owing, in the first two instances to the nature of the process that yields them, and in commercial alcohol to the fact that all the acetic acid and aldehyde in the crude liquid are condensed before the alcoholic vapor arrives at the point for its condensation.

4. The absence of aldehyde from brandy indicates that it is artificial.

New test for Sugar in Diabetic Urine.—Mr. John Horsley has published in the *Chemist* a new method of detecting sugar in urine. A freely alkaline solution of yellow chromate of potassa is mixed with the urine and boiled. If sugar be present, the color will change to a deep sap-green color, owing to the reduction of the chromic acid to oxide of chromium. The test is so sensitive that five or six drops of ordinary diabetic urine will give the indication; which is more sensitive than either Moore's or Trommer's test.

The author does not state whether there is any other body but sugar, that may occur abnormally in the urine, that will react with chromic acid.

Solidified Milk.—The Editor of the *Amer. Medical Monthly* describes the visit made by a committee of the N. Y. Academy of Medicine to the establishment of Mr. Blatchford, in Duchess county, near Poughkeepsie, in that State, where "solid milk" is manufactured on a large scale. The following is the process pursued. "To 112 lbs. of milk, 28 lbs. of Stuart's white sugar were added, and a trivial portion of bi-carbonate of soda, a teaspoonful, merely enough to insure the neutralizing of any acidity, which, in the summer season, is exhibited even a few minutes after milking, although inappreciable to the organs of taste. The sweet milk was poured into evaporating pans of enamelled iron, embedded in warm water heated by steam. A thermometer was immersed in each of these water baths, that, by frequent inspection, it might not rise above the point which years of experience have shown advisable.

To facilitate the evaporation—by blowers and other ingenious apparatus—a current of air is established between the covers of the pans and the solidifying milk. Connected with the steam engine is an arrangement of stirrers, for agitating the milk slightly, while evaporating, and so gently as not to churn it. In about three hours the milk and sugar assumed a pasty consistency, and delighted the palates of all present: by constant manipulation and warming it was reduced to a rich, creamy-looking powder, then exposed to the air to cool, weighed into parcels of a pound each, and, by a press with the force of a ton or two, made to assume the compact form of a tablet, (the size of a small brick), in which shape, covered with tin-foil, it is presented to the public."

The pans are carefully washed after each operation. About one thousand acres of pasture land are connected with the establishment, which is admirably situated for the purposes required.

"Some of the solidified milk which had been grated and dissolved in water the previous evening, was found covered with a rich cream. This was skimmed off, and soon converted into excellent butter. Another solution was speedily converted into wine whey, by a treatment precisely similar to that employed in using ordinary milk. It fully equalled the expectations of all; so that solidified milk will hereafter rank among the necessary appendages of the sick room. In fine, this article makes

paps, custards, puddings, and cakes, equal to the best milk, and one may be sure that it is an unadulterated article, obtained from well-pastured cattle, and not the produce of distillery slops. It is considered a great desideratum for travellers, by sea and land, and the best substitute for fresh milk.

Putrefaction prevented by the filtration of air through cotton wool.—Messrs. H. Schröder and Th. de Dusch, in the June number of the "*Annales de Chimie et de Physique*," have published some interesting results in reference to the effect of filtration on air, in depriving it of the power of causing or sustaining putrefaction. The authors put fresh meat with water in a flask closed with a cork rendered air-tight by wax, through which two L shaped tubes passed, one reaching nearly to the meat. The latter was connected with the top of a large vessel filled with water, and acting as an aspirator by opening a cock below; the other was joined by a tight cork to a tube about an inch in diameter, and 23.5 inches long filled with carded cotton, and having a cork perforated by a small glass tube to admit the external air, placed in the opposite end.

The same quantities of water and flesh were exposed in another flask, to the free action of the air, when the water in both was boiled until the air was driven out by the steam, and the juice of the meat coagulated. The aspirator was then put in action by permitting the water to escape by drops, so as to establish a slow but constant current of air through the apparatus, which was continued for 23 days, (in February and March.) At the end of this time, the meat was found fresh and unchanged, whilst that in the open flask had commenced to putrefy in the 2d week, and emitted an insupportably bad odor. The preservative experiment was repeated between 20th April and 14th of May, with the same result.

The authors then tried, whether under the same circumstances, recent beer wort would be prevented from entering into fermentation, notwithstanding its well known tendency to do it. At the end of 23 days it was quite sweet and unchanged.

When, however, milk simply boiled, and meat cooked in a water bath were exposed in the same apparatus, they putrefied as rapidly as in open vessels. Another experiment, like the first, with meat and broth, made in hot weather, was not entirely successful.

The authors believe a certain class of organic decompositions require mere contact of oxygen, as for instance, the formation of lactic acid in milk, and the putrefaction of fresh meat and of casein; whilst in another class, the presence of certain unknown matters [microscopic infusorial plant germs,] which are capable of separation by filtering or of being destroyed by heat, are necessary to commence the change.

REMARKS ON CHEMICAL NOMENCLATURE.

By J. Cheston Morris, M.D.

Among the great improvements of the day in chemistry, we have always been taught to look upon the perfect system of nomenclature now in universal use as holding the first rank. Certainly nothing can be more important to us than a well-defined language, one which there is no reasonable chance of our misunderstanding, if we wish to have the advantage of comparing the results and reaping the benefits of the observation and labors of chemists throughout the scientific world. There is, however, a looseness of expression creeping up in various quarters, which, if generally indulged in, will very much obscure the whole subject of chemical formulæ. This will be best seen by first citing the law and then calling attention to the infractions.

A neutral salt is defined to be one which contains one equivalent of acid for every equivalent of oxygen in the base, as KO, SO_3, or Fe O, SO_3. Salts containing more than this proportion of acid are called super-salts, per-salts, (or if there be just twice the quantity of acid, bi-salts:) those containing less are called sub-salts.

The state of oxidation of the base commonly enters into the name of the salt when there are several oxides, as, for instance, proto-sulphate of iron, Fe O, SO_3, sesqui-sulphate of iron, Fe_2 O_3, $3SO_3$.

These remarks were suggested by hearing a scientific man of the highest standing in our midst make use of the term, "persesqui-chloride of iron;" when asked for the formula of which, he gave Fe_2 Cl_3. Is this correct? On turning to Wood and Bache's Dispensatory, page 1008, a crystallised form of per-nitrate of iron is noticed, as described by Mr. Ordway, of Massachusetts, and called ter-nitrate of the sesqui-oxide. By the rules above laid down, the formula of this salt should be Fe_2 O_3, $9NO_5$, but

we find he only means $Fe_2 O_3$, $3 NO_5$. Again, on page 1026, et. al., in speaking of the process for the formation of corrosive sublimate and calomel, the phrase "bi-sulphate of the deutoxide of mercury" occurs. By the law, that a neutral salt must have one equiv. of acid for each one of oxygen in the base, the sulphate of deutoxide of mercury must be $Hg O_2$, $2 SO_3$; and consequently the bi-sulphate of the deutoxide $Hg O_2$, $4 SO_3$.

A line or two below, however, we are told that the salt is $Hg O_2$ $2 SO_3$. The expression, then, is simply redundant, and the use of it too extensive and general to call it a chemical error. It is rather a loose mode of writing and thinking.

The evil effects of it will at once be apparent if we think how we should express the constitution of such a salt, for instance, as $Fe O_3$ $3 NO_5$, which is likely to be discovered before long. This should be the ter-nitrate of iron, but the danger of confounding it with $Fe_2 O_3$, $3 NO_5$ would be almost inevitable. Let the laws of nomenclature be fairly understood, and then we shall not have to resort to long, roundabout, ambiguous terms to express the precise constitution of a salt.

ON RED SANDAL WOOD AND XANTHOSANTALIC ACID.

By John T. Plummer, M. D., Richmond, Ind.

Having occasion to prepare a tincture of this wood, I was led to experiment upon its coloring matter, so as to confirm or disprove the statements respecting it, and, if possible, to extend our knowledge of it. The following notes are the result of my examination.

None of the chemical works in my possession, ever name this dye-wood; and, according to our Dispensatories, it appears to be an article rarely used, either in this country or in Europe, "though still a staple article in the Eastern art of dyeing."

Of great antiquity as a medicine, it is now merely used as a coloring material; nevertheless, I find that *santalin* possesses a very perceptible astringency.

A striking characteristic of red saunders is its insolubility in water; thus differing remarkably from the other dye-woods, as Brazil-wood, logwood, &c. Bancroft, however, ("Philosophy of Permanent Colors,") says a "small portion of its coloring matter is soluble in water;" this may have been apparent, either from he large quantities operated upon by the author, or in conse-

quence of the presence of a portion of Brazil-wood, which, it is said, is sometimes intermixed with the sandal wood. But I know not how to apologize for his statement, that in water, "even when assisted by potash or soda, *the solution is incomplete.*" For, as will be subsequently seen, I found nothing to act so energetically as a solvent of the santalin as potash. Bancroft's assertion would be strictly true if he had said *carbonate* of potash.

I subjected two drachms of the saw-dust of sandal wood, by displacement, to the action of alcohol of the sp. gr. .854, at a temperature varying from 50° to 60°, and found that after nine fluid ounces had passed through, the liquid ceased to be colored. The first few ounces of the filtrate were blood-red; the last drainings, light brownish red; the total filtrate, a rich crimson. The residue in the displacer, when washed in distilled water, still appearing red, was treated with alcohol of greater strength, first cold, then boiling, and under considerable pressure; but scarcely a tinge was given to the spirits.

The alcohol was now decanted, the saunders again washed, and subjected to the action of a solution of potash; this instantly became a dark red: and the saunders filtered out, retained no redness, but when dried had a snuff-brown color; this color is not, I think, owing to the action of the potash on the wood, but to the capillary retention of the compound of potash and santalin among its fibres.

Sulphuric acid, dilute and strong, and hydrochloric acid extract but little color from red-saunders; nitric acid appears to have a greater attraction for the woody fibre than the other mineral acids, and furnishes a raw sienna color.

Acetic acid appears to be one of the best solvents of the coloring matter. It acts promptly on the wood; and by boiling it with the sandal-wood dust, exhausts more of its tingent properties than even alcohol does. It likewise retains the richness of the color of the santalin and makes, without addition, a bright writing ink. Yet, after repeated drenchings with boiling acetic acid, the saunders dust retained, when dried, a perceptible hue of red; but yielded, neither to fresh portions of acetic acid nor to strong alcohol, any color. Solution of potash, however, immediately rendered this otherwise exhausted dust, almost black, like wet ulmin, and extracted a currant-juice color from it. Thus

it is evident that this alkali surpasses all the other agents named, as a solvent of santalin.

There is this, however, against the potash, that it acts as a *chemical* and not a mechanical solvent in this case. For, notwithstanding it acts vigorously upon the sandal dust, and dissolves the far greater part, if not all, of the santalin, the coloring matter in it is of a dark venous-blood color; and when this alkaline solution is applied to pale wood, such as the tulip-tree (Liriodendron tulipifera,) it retains scarcely the remotest tinge of red, but assumes a snuff color. On unsized white paper it leaves a similar stain. In both cases, according to this view, acetic acid decomposes the compound in the wood and the paper, and restores the red color of santalin. Paper thus prepared, with the potash solution of santalin, makes a tolerable substitute for blue litmus paper, though not so delicately sensitive as that.

Santalin precipitated from its solution in sulphuric acid, is apparently unchanged; concentrated sulphuric acid dissolves santalin without exerting any obvious chemical action upon it.

Nitric acid, on the other hand, changes the color to a sienna hue; and on the sandal wood dust its chemical agency is very manifest, being attended with a prompt and long continued effervescence, extending even to many hours, and resulting in a combination or compound of a yellowish brown color, which is so unalterable that neither concentrated sulphuric acid affects it, (when precipitated by water and washed) nor concentrated ammonia, nor potash, nor any other chemical agent that I subjected it to; except that the alkalies very readily dissolve it.

From some hasty experiments, I infer that this compound acts the part of an acid toward the alkalies, and at least some metals. I will call it, conditionally, and to avoid circumlocution, *Xanthosantalic acid.* Proceeding with this nomenclature, it appears as above that the xanthosantalate of ammonia and of potash are soluble in water.

To the solution of xanthosantalate of potash, I added solution of sulphate of copper. The precipitate obtained was washed, and treated with acetic acid so long as any cupreous compound was formed with this acid. The tar-colored residue on the filter was then washed, and hydrochloric acid added to it on the filter. A tar-colored solution passed through as a filtrate, holding no

copper in solution. Xanthosantalate of ammonia affords a yellowish green salt with sulphate of copper; and this is also readily decomposed by acetic acid, as well as by the mineral acids.

The blood-red precipitate of santalin from its potash solution was well washed, and then boiled with nitric acid till its color was changed to an orange hue and a solution effected. The filtered solution was evaporated to dryness. The xanthosantalic acid thus prepared was found to be soluble in water, ether, alcohol and acids; to have a very astringent taste; just perceptibly to redden litmus paper; to form orange-colored salts with potash and with ammonia; a gamboge-colored precipitate with neutral acetate of lead and with chloride of barium; a light brown precipitate with protochloride of tin and with the salts of iron; but no precipitates with sulphate of copper, bichloride of mercury, alum, chloride of ammonium, nor sulphate of zinc. Xanthosantalate of ammonia, however, and sulphate of copper, decompose each other, and form a precipitate of xanthosantalate of copper of a yellowish green color. A similar reaction takes place with sulphate of zinc, resulting in the formation of a tar-colored precipitate. A solution of alum produced in a few seconds a like precipitate. So does chloride of platinum. But I obtained no precipitates with xanthosantalate of ammonia and chloride of gold, nor with chloride of mercury, nor chloride of ammonium. The protochloride of tin and sesquichloride of iron, the chloride of calcium and chloride of barium, all yielded precipitates, but the last by far the most abundant one. The nitrate of barytes, like the chloride of lime, produced but a scanty precipitate. Chlorate of potash, tartarized antimony and ferro-cyanide of potassium, none.

The action of nitric acid on protein and santalin is followed by the evolution of gas, the production of oxalic acid and the formation of similar yellow, solid acids, the xanthoproteic and the xanthosantalic. Both these acids slightly redden litmus paper, both form soluble orange-colored salts with alkalies, both form colored precipitates with metallic salts. But xanthoproteic acid is without taste; xanthosantalic acid is remarkably styptic; xanthoproteic acid is insoluble in water, alcohol and ether, xanthosantalic is readily soluble in them all. These latter characters are sufficient to distinguish the two acids.

ON THE QUANTITY OF NICOTINA INHALED BY TOBACCO SMOKERS.

The *Journal de Chimié Médicale*, for January, 1855, contains an interesting article on tobacco and nicotina, from which we extract the following:—

M. Malapert, a distinguished chemist and pharmaceutist of Poitiers, France, has been making researches to ascertain the quantity of *nicotina* which passes into the mouth of a smoker during the combustion of a certain weight of tobacco. He arranged an apparatus for burning the tobacco, consisting of a crucible penetrated by a tube beneath, the opposite end of which passed through a cork in the tubulure of the first of a series of three Woulf's bottles, connected by ∩ tubes, the last one being connected with a large tin vessel, filled with water, and furnished with a stop-cock beneath. The first and second bottles were empty, the third contained acidulated water, through which the vapor uncondensed in the other vessels had to pass. Into the crucible he put 50 drachms of smoking tobacco, ignited it, and on opening the stop-cock, a current of air was established through the apparatus, (by the flow of the water,) until the combustion was complete. Nine drachms of ashes remained in the crucible, equal to 18 per cent. of the tobacco burned; consequently, the vapor amounted to 41 drachms, or 82 per cent. About one third of this quantity was condensed in a liquid state, in the first flask; the second was merely moist and stained with pyrogenous matters; the vapor which was found in the tin vessel had a disagreeable odor, which differed from that of tobacco smoke.

The liquid in the first bottle consisted of *water*, *tar*, *empyreumatic oil* and *carbonate of ammonia*. It was treated by sulphuric acid, potassa, and dried chloride of calcium, and yielded 4¼ drachms of nicotina, or 8½ per cent. of the tobacco. The acidulated water contained but 4 or 5 grains of nicotina, which, with that in the second bottle, which the author did not isolate, made the whole amount to about 9 per cent. of nicotina in French smoking tobacco.

In another experiment, M. Malapert obtained 10 per cent. of anhydrous nicotina.*

These results have an interesting bearing on the popular habit of smoking tobacco. The high boiling point, and consequent ready condensibility of nicotina, causes the most of that poisonous substance to be stopped before it reaches the mouth, in properly arranged pipes; and when the smoking is stopped before all the tobacco is consumed, the latter acts as a means of retaining the poisonous empyreumatic oil.

The volatilization of nicotina is materially aided by the presence of moisture, which accounts for the fact that smokers are much more easily sickened by moist tobacco than by the well-dried leaf.

As the agreeable sensation produced by tobacco smoke depends on the composition of the vapors that are drawn into the mouth, of which *nicotina* makes a part, the preceding statements perfectly explain the different taste (goût) that amateurs find at the beginning and end of a pipe or segar. In both cases, at the commencement, the most of the nicotina is condensed in the unconsumed tobacco, from whence it is driven as the fire invades that portion, and reaches the mouth in larger proportion.

The reason that a *new* pipe is said to communicate a bad taste to tobacco, is owing to the absorbent power of the clay, in retaining nearly the whole of the nicotin until it becomes saturated, and hence the narcotic effect of the tobacco is materially decreased.

Finally, the *houka*, and other smoking apparatus used in the East and in India, owe their harmlessness, notwithstanding incessant use, to their construction causing the condensation of nearly all the nicotina before the vapor reaches the mouth of the smoker, owing to its having to traverse a layer of water and to expand in a chamber above. Besides, the tobacco is prepared by the addition of cinnamon, essence of roses, and a little sugar.

As the result of his researches M. Malapert advises smokers, 1st, not to smoke moist tobacco; 2d, to use only those pipes furnished with a condensing chamber; 3d, not to smoke either a pipe or segar longer than till half the tobacco is consumed.

*This proportion is so much higher than the results of M. Schloesing with the strongest kinds of unmanufactured tobacco, that we must either doubt the purity of Malapert's nicotina, or believe that Schloesing did not exhaust his specimens of tobacco.—*Ed. Am. Jour. Pharm.*

SPECIFICATION OF THE PATENT GRANTED TO RICHARD ALBERT TILGHMAN, OF PHILADELPHIA, U. S. OF AMERICA, CHEMIST, FOR IMPROVEMENTS IN TREATING FATTY AND OILY MATTERS, CHIEFLY APPLICABLE TO THE MANUFACTURE OF SOAP, CANDLES, AND GLYCERIN.—Dated January 9, 1854.

The first part of my said invention consists in a mode or modes of obtaining free fat acids and solution of glycerin from those fatty or oily bodies of animal and vegetable origin which contain glycerin as their base.

For this purpose I subject these fatty or oily bodies to the action of water at a high temperature under pressure, so as to cause the elements of those bodies to combine with water, and to obtain, at the same time, free fat acids and solution of glycerin.

I mix the fatty body to be operated upon with from a third to a half of its bulk of water, and the mixture may be placed in any convenient vessel in which it can be subjected to the action of heat, to a temperature about the same as that of melting lead, until the operation is complete; and the vessel must be closed, so that the requisite amount of pressure may be applied to prevent the conversion of the water into steam.

The process may be performed more rapidly and also continuously by causing the mixture of fatty matter and water to pass through a tube or continuous channel heated to the temperature already mentioned, the requisite pressure for preventing the conversion of the water into steam being applied during the process; and this I believe is the best mode of carrying this part of my invention into effect.

In the drawing hereunto annexed are shown figures of an apparatus for performing this process speedily and continuously, but which apparatus I do not intend to claim as any part of my invention.

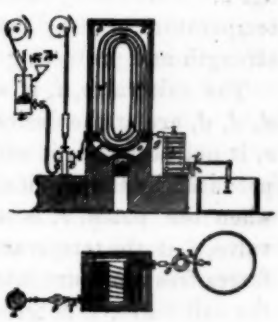

Fig. 1, is a vertical section of this apparatus; and

Fig. 2. shows the various parts of the apparatus in horizontal section; I place

the fat or oil in a fluid state in the vessel, *a*, with from one-third to one-half its bulk of warm water; the disk or piston, *b*, perforated with numerous small holes, being kept in rapid motion up and down in the vessel, *a*, causes the fat or oil and water to form an emulsion, or intimate mechanical mixture. A force pump, *c*, like those in common use for hydraulic presses, then drives the mixture through a long coil of very strong iron tube, *d*, *d*, *d*, *d*, which being placed in a furnace, *e*, *e*, is heated by a fire, *f*, to about the temperature of melting lead. From the exit end, *g*, of the heating tubes, *d*, *d*, the mixture, which has then become converted into free fat acids and solution of glycerin, passes on through another coiled iron tube, *h*, *h*, *h*, immersed in water, by which it is cooled down from its high temperature to below 212° Fah., after which it makes its escape through the exit valve, *i*, into the receiving vessel. The iron tubes I have employed and found to be convenient for this purpose, are about one inch external diameter, and about half an inch internal diameter, being such as are in common use for Perkins's hot-water apparatus. The ends of the tubes are joined together by welding to make the requisite length; but where welding is not practicable I employ the kind of joints used for Perkins's hot-water apparatus, which are now well known. The heating tube, *d*, *d*, *d*, is coiled several times backwards and forwards, so as to arrange a considerable length of tube in a moderate space. The different coils of the tube are kept about one-quarter of an inch apart from each other, and the interval between them is filled up solid with cast iron, which also covers the outer coils or rows of tubes to the thickness of half or three-quarters of an inch, as shown in fig. 2. This casing of metal insures a considerable uniformity of temperature in the different parts of the coil, adding also to its strength and protecting it from injury by the fire.

The exit valve, *i*, is so loaded, that when the heating tubes, *d*, *d*, *d*, are at the desired working temperature, and the pump, *c*, is not in action, it will not be opened by the internal pressure produced by the application of heat to the mixture, and therefore when the pump, *c*, is not in action, nothing escapes from the valve, *i*, if the temperature be not too high. But when the pump forces fresh mixture into one end, *j*, of the heating tubes, *d*, *d*, *d*, the exit valve, *i*, is forced open to allow an equal amount of the

mixture which has been operated upon to escape out of the cooling tubes, *h*, *h*, at the valve, *i*, placed at the other end of the apparatus. No steam or air should be allowed to accumulate in the tubes, which should be kept entirely full of the mixture. For this purpose, whenever it may be required, the speed of the pump should be increased, so that the current through the tubes may be made sufficiently rapid to carry out with it any air remaining in them. Although the decomposition of the neutral fats by water takes place with great quickness at the proper heat, yet I prefer that the pump, *c*, should be worked at such a rate in proportion to the length or capacity of the heating tubes, *d*, *d*, *d*, that the mixture while flowing through them should be maintained at the desired temperature for about ten minutes before it passes into the refrigerator or cooling parts, *h*, *h*, of the apparatus.

The melting point of lead has been mentioned as the proper heat to be used in this operation, because it has been found to give good results; but the change of fatty matters into fat acids and glycerin takes place with some materials (such as palm oil) at the melting point of bismuth, yet the heat has been carried considerably above the melting point of lead without any apparent injury, and the decomposing action of the water becomes more powerful as the heat is increased. By starting the apparatus at a low heat and gradually increasing it, the temperature giving products most suitable to the intended application of the fatty body employed, can easily be determined.

To indicate the temperature of the tubes, *d*, *d*, *d*, I have found the successive melting of metals and other substances of different and known degrees of fusibility to be convenient in practice. Several holes, half an inch in diameter and two or three inches deep, are bored into the solid parts of the casting surrounding the tubes, each hole being charged with a different substance. The series I have used consist of tin, melted at about 440°, bismuth at about 510°, lead at about 612°, and nitrate of potash at about 660°. A straight piece of iron wire passing through the side of the furnace to the bottom of each of the holes, enables the workman to feel which of the substances are melted, and to regulate the fire accordingly. It is important for the quickness and perfection of the decomposition that the oil and water during their entire passage through the heating tubes should remain in the

same state of intimate mixture in which they enter them. I therefore prefer to place the series of heating tubes in a vertical position, so that any partial separation which may take place while the liquids pass up one tube, may be counteracted as they pass down the next. I believe that it will be found useful to fix at intervals in the heating tubes of such apparatus as may admit of such an addition, diaphragms pierced with numerous small holes, so that the liquids being forced through these obstructions may be thoroughly mixed together. I deem it prudent to test the strength of the apparatus by a pressure of 10,000 lbs. to the square inch before taking it into use; but I believe that the working pressure necessary for producing the heat I have mentioned, will not be found to exceed 2000 lbs. to the square inch. When it is desired to diminish the contact of the liquids with iron, the tube or channels of the apparatus may be lined with copper.

The hot mixture of fat acids and solution of glycerin which escapes from the exit valve of the apparatus are separated from each other by subsidence; the fat acids may then be washed with water, and the solution of glycerin concentrated and purified by the usual means.

The fat acids thus produced may, like those obtained by other methods, be used in the manufacture of candles and soap, and applied to various purposes according to their quality; and when desired they may also be first bleached or purified by distillation or otherwise, as is now well understood.

I prefer that the fatty bodies should be previously deprived, as far as practicable, of such impurities as would cause the discoloration of the fat acids produced; but when the fat acids are to be finally purified by distillation, this preliminary purification is of less importance.

When any acid or other corrosive agent shall have been used for purifying, hardening or otherwise preparing the fatty body to be operated upon, I take care that all traces of it shall be washed out or neutralized before passing it through the apparatus. Some fatty bodies (particularly when impure) generate during the process, a portion of acetic or other soluble acid, which might tend to injure the iron tubes; in such cases I add a corresponding quantity of alkaline or basic matter to the water and oil before they are pumped into the tubes.

The second part of my said invention consists of a mode of treating a mixture of fatty matters, (whether acid or neutral) and a carbonated alkali for the purpose of manufacturing soap.

For this purpose, I mix the fatty bodies in a liquid state with the quantity of carbonated alkali in solution which may be necessary to convert it into soap, and then subject the mixture to a high temperature under pressure, in like manner as hereinbefore described in practising my mode of obtaining fatty acids and glycerin. And for this purpose the apparatus hereinbefore described for producing the fatty acids and glycerin by a continuous process may be used for the production of soap in a similar manner. The carbonated alkali may be dissolved merely in the quantity of water which is intended to remain in the soap produced. If resinous or other matters are intended to be used in the manufacture of the soap, they may be dissolved either in the alkali solution or the oil, or may be combined with the soap after it has left the apparatus.

The degree of heat required is less than that which is necessary to produce free fat acids, and should generally be kept between the melting points of tin and bismuth. At about 350° Fah. the neutral fats will form soaps, with the solution of alkaline carbonates, but a higher temperature will produce the result more quickly.

The carbonic acid expelled from the alkali in this process, when performed in the apparatus above described, escapes as the soap issues from the exit valve; if but little water has been used, and the quality of the soap is sufficiently good without further purification, it can be put into frames to harden at once, or it may be put into the coppers, boiled up, and separated from the glycerin (when neutral fats have been used,) and finished in the usual manner.

I claim as of my invention,—

First, the manufacturing of fatty acids and glycerin from fatty bodies by means of water and heat acting thereon, as hereinbefore described; and

Secondly, the manufacturing of soap by treating a mixture of fatty matters and a carbonated alkali, as above described.—*Jour. Franklin Institute, Jan.* 1855, *from Repert. Pat. Invent. Nov.* 1854.

OBSERVATIONS ON THE ANTIMONIAL POWDER OF THE LAST DUBLIN PHARMACOPŒIA (1850,) AND ON THE MEDICAL EFFECTS OF THE TEROXIDE OF ANTIMONY.

By Jonathan Osborne, M. D.,

King's Professor of Materia Medica, Physician to Mercer's Hospital, &c.*

It is well known that the antimonial powder of the Pharmacopœias was first adopted as an imitation of Dr. James's fever powder, but the opinion has for a long time been gaining ground among practitioners that it is nearly, if not altogether, inert. I have given it in various doses, large and small, and long ago made a series of trials expressly on this subject, but could never perceive any sensible effect except when combined with calomel. A powder of two grains of calomel and four of antimonial powder, taken at night, was not unfrequently followed by perspiration; but when given alone it never appeared to me to have any effect, and I am thus fully enabled to confirm the statements as to inefficiency, made by Mr. Hawkins, Dr. Duncan, and Dr. Elliotson.

That it should be thus inactive may be explained from the fact that the antimony is almost entirely in the form of antimonious acid, and that the proportion of teroxide of antimony it contains is insignificant, never amounting to four per cent, according to Dr. Maclagan, and totally absent in some samples according to the experiments of Mr. Philips.

In the *Philosophical Transactions* for 1801, Mr. Chenevix described a mode of preparing antimonial powder in the humid way, in which teroxide of antimony was precipitated from the hydrochlorate by ammonia. It was strange that although this process was referred to in terms of high commendation by almost all the succeeding writers on pharmacy, and was admitted to possess the great advantage of uniformity of oxidation, of which the process by heat was unsusceptible, yet that it never was admitted into any of the Pharmacopœias. It was not till the publication of the Dublin Pharmacopœia in 1850, that a mode of preparing the powder by precipitation appeared, and in this a great improvement was introduced by using tartar emetic instead of the solution in hydrochloric acid which Mr. Chenevix had employed. This

*Read before the Association of the King and Queen's College of Physicians.

preparation, however, though bearing the name of antimonial powder, is yet different from it in one respect, and that the most important, in all the antimony it contains being exclusively in the state of teroxide. It has therefore appeared to me desirable to ascertain its medical effects by actual experiment. The only account of the effect of the powder, as prepared by Mr. Chenevix, that I can find, is contained in the following words, with which his paper concludes :—"I gave some of my powder to Dr. Crichton, Dr. Babington, and Mr. Abernethy, gentlemen whose extensive practice and acknowledged skill sufficiently enabled them to judge of its medical properties. They all concur in opinion, that in its general effect it agrees with Dr. James's powder and the pulvis antimonialis, but that it is more mild, and consequently may be given in larger quantities, seldom producing nausea or vomiting, in doses of less than eight or ten grains." The results I have obtained are very different.

I have tried it in twenty cases, selected for careful observation in Sir Patrick Dun's Hospital. The powder was prepared according to the process of the Dublin Pharmacopœia, 1850, by Mr. Morgan, whose accuracy and ability are well known. The dose given in every instance was five grains in the evening and the same at bed time. The cases were chiefly rheumatism, pneumonia, and bronchitis, and the patients were all adults. In order to present a view of the percentage of the effects, and to facilitate recollection and comparison with other observations, I have reduced them to the form of decimals.

TABLE *of the Effects of the Pulvis Antimonialis of the Dublin Pharmacopœia*, 1850. *Dose five grains evening and night.*

More or less gentle action on the bowels.	Nausea.	Vomiting.	Perspiration.	Perspiration without Nausea.	No perceptible effect.
.50	.45	.20	.65	.20	.10

In order to ascertain the effect of the teroxide of antimony taken separately, I tried some prepared by Mr. Morgan, according to the Dublin Pharmacopœia, 1850. It was given in three grain doses evening and night, and to the same average class of cases as the above, selected in Sir Patrick Dun's and Mercer's Hospitals.

TABLE *of the Effects of the Teroxide of Antimony (Algaroth's Powder,) given in doses of three grains evening and night.*

More or less gentle Action on the Bowels.	Nausea.	Vomiting.	Perspiration.	Perspiration without Vomiting.	No perceptible Effect.
.60	.40	.15	.70	.40	.05

In order to try how far the action of the teroxide could be influenced by the presence of acids, I selected six of the cases in which there had been no effect, or only perspiration, and added to each dose the same weight of nitric acid. The result was in every case either nausea, vomiting or purging. Hence itappears that the teroxide is capable of combining with acids in the stomach, and of forming salts resembling tartar emetic. I find also that the addition of one or two grains to small doses of either rhubarb or aloes produces a remarkable augmentation of the purgative effect of these articles'

The conclusions to be deduced from my observations are :—

1st. That the antimonial powder of the present Dublin Pharm. (1850) differs from that hitherto prepared, not only by containing the antimony exclusively in the state of teroxide, but by medical effects of which the older preparation is nearly if not quite destitute.

2nd. That as it has not been identified by a distinct name (which is to be regretted,) the prescriber should, to avoid confusion, always distinguish it as the antimonial powder of the Dublin Pharmacopœia of 1850.

3d. That the teroxide of antimony (Algorth's powder,) inasmuch as it contains all the active part of antimonial powder, may be safely substituted for it, the phosphate of lime not contributing to its virtues, and having been at first accidentally associated with it in consequence of the imperfect chemistry of the time when the original process was devised.

4th. That the average maximum dose of the teroxide of antimony, as a diaphoretic for an adult, is three grains evening and night.

5th. That the addition of acids renders it more emetic and more purgative.

6th. That the occasionally violent effects ascribed to it by some of the older writers were most probably due to the presence of chloride of antimony, from want of care in the preparation, and that this may be most effectually excluded by precipitating it from tartar emetic by means of an alkaline solution.—*The Dublin Quarterly Journal of Medical Science, aud Pharm Jour.*

ON LIQUOR AND EXTRACTUM TARAXACI AND OTHER EXTRACTS AND EXPRESSED JUICES.

By Mr. R. W. Giles.

The few remarks which I have to offer are so hastily arranged that they ought to be prefaced by a longer apology, if it were not my belief that the Pharmaceutical meetings would be benefitted if more rashness was manifested by Members. These observations are rather designed to suggest a subject for consideration, than to describe the result of any sufficiently elaborated investigation.

At the present time, the first that has ever offered to the Pharmaceutical body an opportunity of sharing in the preparation of the Pharmacopœia by which their operations are to be guided, it seems particularly desirable that our views should be sufficiently comprehensive, that we should not commence our labors by a seriatim revision of preparations in an isolated condition, but rather with a consideration of the objects which the several classes of pharmaceutical preparations are intended to subserve. For example, it might be a subject for consideration whether the tinctures are not inconvenient from containing so large a proportion of alcohol to the medicine intended to be conveyed, as often to interdict their administration in efficient doses. This may not be the best illustration possible, but it will serve as an illustration of the propriety of considering first how tinctures are likely to be employed, and afterwards how any particular tincture will be best made.

The class of preparations to which I wish now to refer, are "*Extracts*," and I would propose it as a subject worthy of serious thought: "What is the object in view in the preparation of extracts?"

This form of medicine is obviously intermediate between the crude drug and the alkaloid, resin, or what not, to which the efficacy of the drug is supposed to be due. In some cases the active principle is obscure, as in hyoscyamus, and the extract is a convenient approach to that which cannot be easily obtained. In other cases, as of nux vomica and aconite, the alkaloids are too deadly to be manipulated without anxiety, and the alcoholic extract is preferred as being more tractable.

It is clear, therefore, that the extract is sometimes preferred for its concentration, and sometimes for avoiding an ultimum concentration, and this diversity of object leaves some margin for the interpretation of the desideratum in extracts.

It is, however, worthy of consideration whether some modification of the present processes might not be advantageously suggested by keeping these objects in view. These reflections have been chiefly occasioned by some experiments with taraxacum juice. The curative value of this plant seems generally accepted, yet it is a singular fact that we have but one authoritative formula for its manipulation, which yields a very unsatisfactory result in the form of extract of taraxacum, which is now very rarely employed when the specific effects of the plant are desired; it is chiefly confined to the office of blending pills, with only a secondary importance attached to its presence.

Other preparations exist, so various as to occasion great perplexity to us, and not unfrequently to impress wandering customers with the suspicion of our inaccuracy, on account of the opposite appearances which one or another will cause in their medicines. They may, however, be considered in two classes:—the inspissated juices, introduced by Mr. Hooper, or the more fluid liquors, by Mr. Squire. I believe that grave objections apply to each, which I propose cursorily to observe upon. The inspissated juices contain an excessive proportion of inert quasi-starchy matter. The fluid liquors are largely impregnated with sugar.

In common with many others, I have found great caprice in the appearance of the expressed juice, and its behaviour during inspissation. Sometimes it has appeared thick, and of a pale drab color, and on standing for a short time (say half an hour) has become pulpy. In this condition it bears a very small degree of evaporation before it becomes so thick as to put a period to the process. The result is then of a drab color, and agrees very closely with Mr. Hooper's preparation, becoming opalescent, when diluted with water, resembling, as Mr. Hooper himself states, the milky juice of the root.

At other times the juice is darker in color, very much more fluid, and nearly free from any of the quasi-starchy deposit. It

bears a considerable diminution of the volume without assuming the pulpy appearance, and ultimately becomes a muddy looking extract without passing through that state. It has also been my experience that juice originally possessing this character is prone to become sour during the evaporation, even when this is conducted with great care. These differences, which might be supposed to be due to the condition of the root at various seasons of the year, are not solely influenced by this cause, for I have found them exhibited in the operations of two consecutive days upon roots obtained from the same source; and I am inclined to believe that it is occasioned by the comparative length of time between gathering and pressing, even more than the period of year at which the collection of the roots takes place.

Further to elucidate the matter, some examination of the juice seemed necessary, the results of which I beg to submit:—

1st. A specimen of the drab-colored puddly juice became clear by boiling, so far agreeing with the behaviour of starch.

2nd. When treated with iodine it gave no blue iodide of starch.

3rd. The iodine added in the last experiment was occupied so as to lose its action upon gelatinous starch subsequently added.

4th. When examined under the microscope, there was no evidence of well defined starch grains, but abundance of irregular peculiar bodies without color, but otherwise very much resembling the endochrome of ordinary parenchymatous cells. There were also diffused through it occasional groups of cylindrical cells placed end to end, some of the cells still full of these granular bodies, some empty, some ruptured and discharging their contents.

5th. The juice gave slight indications only of sugar when examined by Trömmer's test, even after inspissation, and would of course have been likely to have afforded still less before having been subjected to the action of heat, though this would probably vary according to the season.

6th. The endochromatous matter was found to be easily converted into sugar by boiling in the presence of SO_3.

Sufficient observations of the less turbid, darker juice, were

not made, owing to the hasty manner in which the matter was attended to; but so far as they went they indicated a smaller presence of the endochrome. This indeed is sufficiently expressed in the description of it as a juice wanting the *thickness* which distinguishes the other.

I believe the cause of this variation may be thus correctly explained:—

While the root is fresh, and before the cessation of vital action has produced a change in the juices, the cells containing the endochrome are more easily ruptured, and the endochrome itself is more perfectly suspended in the juices, and more freely yielded to expression.

It is also possible that a period of delay may allow a process of fermentation to be imitated, which may explain the greater disposition of the more fluid juice to become sour during evaporation at a moderate temperature.

The fluid "Liquors of Taraxacum," which I believe are generally made by a certain evaporation of the juice and addition of spirit, with subsequent filtration to separate the starchy matter, universally, so far as I know, abound in sugar.

We have now to consider the influence, in a pharmaceutical point of view, of the presence of this large proportion of endochrome in the one case, and of sugar in the other.

In the first place, I maintain that the endochrome gives rise to a very fallacious estimate of the preparation in which it occurs. We are prone to consider that the great aim is to achieve a *pale drab-colored fluid*, which shall give a *milky mixture with water*, the first of these features being in fact an indication of the absence of any large proportion of that soluble matter which we assume to carry the medicinal property of the taraxacum, and the second, of the copious presence of inert matter.

In the case of the fluid liquors we find a portion of the endochrome has been converted into its other inert modification of glucose, and still contaminates the product, and this presence is generally held to be objectionable, but probably the greatest objection to this, as to the other, is, that they are not sufficiently concentrated to make the usually prescribed doses of any avail.

All that has been said of the two types of liquid taraxacum

applies with increased force to the corresponding extracts—the ordinary P. L. extract, which is so notoriously contaminated with glucose, being represented by the liquor taraxaci, and that other form of opaque extract which has recently been proposed as its substitute agreeing with the inspissated juice—the sugar of the P. L. extract renders it objectionable, and the large proportion of the endochrome present in the other dilutes it in a manner that mitigates against the intention of an extract.

The application of these observations is in determining the best means of getting in the form of a fluid or an extract, the largest amount of the active agency of taraxacum in the smallest volume, and I am inclined (though with insufficient experience) to think that two ways offer the means.

First, by allowing the roots to become somewhat flaccid by exposure, by which means I anticipate that less endochrome would be separable, and then to bruise and press them, sprinkling with water if found advantageous.

Second, to operate upon dry roots by cold maceration.

By neither of these processes could we obtain the pulpy-looking inspissated juice which we have learned to desire, but in my opinion this is no loss, as I have before stated my belief that this appearance is the measure in point of thickness of the inert matter present, and in point of color of the small extent to which concentration has been carried.

We may further apply these considerations to extracts generally, and reflect whether we ought not to reduce their volume as much as possible, in order to make them fulfil their purpose, one part being of course the administration of an average dose in a pill, and whether it should not be our aim in the new P. L. to exclude inert matter, such as starch and albumen, from all of them. By these means the extracts even from drugs originally very different in quality would be assimilated, and one of the difficulties of adjusting their doses would be surmounted. A step in this direction was taken in the P. L. of 1851, by the substitution of cold maceration for boiling in several cases, due, I suspect, to the suggestions of Mr. Battley; but it is still a question whether much more does not yet remain to be done by similar means, and by the further employment of alcohol and

ether as solvents. There will doubtless be a smaller product to the manipulator, just as one sovereign is of less volume than twenty shillings; but the possessor of the sovereign scarcely needs our sympathy; neither should we deserve consideration if narrow-minded notions led us in a direction opposite to the welfare of the sick—of which, however, there is no cause for apprehension.—*London Pharm. Jour.* Dec. 1854.

ON THE STRUCTURE OF THE STARCH GRANULE.

By Mr. James John Field.

The physical characters exhibited by the lowest forms of animal organisms appear so closely allied to those found in certain plants, that it is still an unanswered question, how those forms may be correctly referred to the kingdom of which they really form members.

In less equivocal cases *general* distinctions are had recourse to, but such distinctions are inapplicable to the forms of which I now speak, and therefore is it that the necessity for some *specific* distinction has become recognized.

But although many investigators have devoted attention to this subject, no one seems yet to have indicated any peculiarity of structure in either the animal or vegetable kingdoms, which may be available as a *positive line of demarcation* between them. For the solution of this problem we must doubtless rely upon the advancing powers of the microscope, which are daily making us better acquainted with the proximate elements of organic structures; and from this consideration every microscopic observation tending to elucidate the nature of these elements should be recorded.

It is under this impression that I make the following observations upon the structure of the starch granule; for notwithstanding that the subject has been already ably treated by various writers, some maintaining its membraneous, and others its non-membraneous character, the question does not seem hitherto to have been so absolutely decided as to render additional evidence unnecessary.

By availing myself of the peculiar organic property of endosmose, I have obtained what I believe to be the most complete and demonstrative evidence of the existence of a membrane

around the starch granule; and I believe it will be generally admitted, that the action I am about to describe can only be accounted for on the premise that such membrane really exists.

I took a small quantity of the starch of Canna edulis, and having completely saturated it with pure glycerine on a glass slide, I covered it with a disc of thin microscopic glass.

It occurred to me, that if the granules were surrounded by a membrane, and the glycerine allowed to penetrate to their contents, the subsequent addition of a little water, by diminishing the gravity of the external fluid, would call the principle of endosmose into play; that the fluid contents of each granule would increase in volume by endosmotic action, and therefore, that unless the surrounding membrane were very distensible it would be ruptured.

On examination by the microscope I found this to have been the case. The granules had split open, and bore on their external surfaces distinct evidence of a membrane that had been corrugated by release from unusual tension; the membrane around some of the granules being visible in distinct longitudinal wrinkles, from the hilum downwards.

Were the starch granules composed of superposed laminæ only, as some observers have maintained, it is not comprehensible why the addition of water, as before described, should rupture them; and even admitting the possibility of this occurring, through some agency not understood, the conclusion is almost irresistible, that the rupture would then have been in the direction of the laminar surfaces, whereas, being from the hilum downwards, it was, of course, at right angles to those surfaces.

The fact of the fracture always occurring in the direction of the axis may be readily accounted for, by adopting the supposition that the concentric lines, observable upon the surface of the granules, are simply plications of the membrane, admitting thus of its extension from one extremity to the other, but not laterally. This would, of course, *necessitate* the fracture being, as I have observed, in the direction of the axis, and this view derives much support from the circumstance of the concentric lines having disappeared during the progress of the experiment.

From these observations then it would appear, that starch consists of granular matter, enclosed in a membraneous vesicle, of

very sparing distensibility; and that the superficial markings are simply minute folds in the membrane, probably caused by some contraction that the granule undergoes in passing from the fresh state, as it exists in the plant, to the dry form.

2, *Southward Terrace, Highgate.*

The CHAIRMAN said, that Mr. Field's experiments tended to confirm the views which had been entertained by other observers; such, for instance, as Mr. Geo. Busk, who, in December, 1852, before the Microscopical Society, read a clever and interesting paper "On the Structure of the Starch Granule." His reasons carried great weight, one of the strongest arguments being founded on the action of heat and other agents which cause the granule to swell, and before bursting, the concentric lines were found to disappear; thus tending to prove that the lines are on the surface. Still he (Mr. Deane) had not been able to satisfy his mind that such views were altogether correct. He rather inclined to those of Schleiden and others, and more particularly those of the late Dr. Pereira, who, when preparing his last edition of the *Elements of Materia Medica*, devoted much time to this difficult question. Dr. Pereira considered the granule to consist of concentric layers, inclosed in a smooth, tough membrane or cell. The models on the tables, designed by him, and made expressly to illustrate his lectures, would in some degree explain his views. Mr. Field considered the concentric markings to be external corrugations; and Mr. Busk and others, that these corrugations are on one side only. Now these markings were found to exist equally in starch fresh from the tuber as in that which had been dried, and therefore they could not be the effect of any shrinking by loss of moisture. In the case of Yam starch, which consists of flat grains, it would be observed, on looking on its flat side, that the rings followed the broad outline, and on looking on the edge that they equally followed the narrow outline, results similar to what would be obtained on viewing in the same way a nest of flat glass shades. If a little Yam starch were placed in water between two pieces of glass under the microscope, most of the grains would appear on their flat sides, but some few would be on edge, or if not, they might be made to turn over, so as to show their edges, by giving a slight lateral movement to the covering glass, when they may be readily observed in every position. This peculiarity of marking, he thought, was not much like mere external corrugations, but more like the effect produced by superposed layers, and he believed it was this starch, so well adapted from its form to demonstrate the theory, that confirmed Dr. Pereira in the opinion he entertained. It did not follow that because there were concentric layers of matter there should be concentric membranes enveloping those layers, any more than that there should be a tough bark investing every annulation in an exogenous stem. That there was one general investing membrane or cell there was no difficulty in showing.

If a little boiling water were poured on to starch, and it were then examined under the microscope, an abundance of empty collapsed cells would be observed; and if this aqueous solution of starch were to be largely diluted with water they would all gradually fall to the bottom of the vessel.

So little was known of the mode of growth of the starch cellule that it was impossible to say at present how the increment takes place. It may be uniformly, or it may be periodic, the difference between night and day possibly being sufficient to account for the difference in density of the layers; that is to say, supposing the markings to indicate concentric layers—just as the seasons appear to affect the density of the annular rings in the stems of trees. With regard to the direction of the fissure on the bursting of the granule, longitudinally would be the natural direction in a body constituted of concentric layers; at least, it was very doubtful if the concentric layers would offer any impediment to such a mode of splitting. From what is observed in reference to exogenous stems, one would infer that there would be a greater facility for rupture in that direction. Wood splits readily in the direction of its axis—that is longitudinally, not at all transversely, or at right angles to it, and in many instances not readily in the direction of the annulations, or perpendicularly to the medullary rays, and in some of the coniferæ this tendency is extensively rendered available in the production of laths for ceiling and roofing purposes.

Having seen Mr. Field's paper before it was read, he had tried the experiment referred to in it, but the result had not satisfied him that the appearance observed was due to the rupture of the granules. He was rather disposed to refer it to a shrinking of the granule and consequent puckering of the enveloping membrane. His observations, however, had been somewhat hastily made, so that he could not give a decided opinion. He thought that a further investigation of the subject was required, and that many more observations must be made before either of the theories which had been propounded could be considered as established.

Mr. Giles said, as the Chairman seemed to differ from the author of the paper as to the cause of the appearance presented by starch granules when immersed in solution of glycerine, the latter describing the action as that of a swelling of the granule and a bursting of its envelope, while the former considered that a reverse action took place, he thought it desirable that some experiments should be made to determine the mode of action of aqueous solution of glycerine and of starch on membrane. If it should be found that, in accordance with the usual phenomena of endosmose and exosmose, a thin solution of glycerine permeated membrane more quickly than the thick gelatinous contents of the starch granule, this would afford a strong argument in favor of Mr. Field's opinion.

Dr. Edwards thought the question a very difficult one to decide, and therefore one upon which much difference of opinion would probably continue to exist. The Chairman appeared to meet Mr. Field half-way, for

while the latter combated the notion that the markings in starch granules were due to the existence of a succession of layers or strata without any distinct covering or envelope, contending that there was an outer membrane which was permeated by a dilute solution of glycerine; the latter admitted the existence of the membrane, although denying the endosmotic action of solution of glycerine, and at the same time contended that the markings were due to concentric layers within. He had, himself, in submitting starches to microscopic examination, observed certain phenomena, some of which were in favor of one and some of the other of these views. Thus, dilute acetic acid, while it caused a swelling of the granules, rendered the markings more distinct. On the other hand, gelatine and most of the media employed for mounting microscopic objects, sooner or later, caused the entire disappearance of the markings. So much indeed was this the case that a good medium for mounting the starches so as to show the markings was still a desideratum.

Mr. BENTLEY said the structure of the starch granule had always been an interesting subject, that it was more particularly so at the present time, when starch, or at least a substance almost identical with it, had been found in animal structures, and thus its presence could no longer be relied upon as an absolute distinctive character between an animal and a vegetable. With regard to the structure of the starch granule, he had always been a firm believer in Schleiden's views in all their essential points, and he had been strengthened in this belief by repeating the experiment of Mr. Busk and Dr. Allman. That the starch granules consisted of a series of hollow scales or shells placed over one another, appeared to him to be supported by the results of many experiments and observations. Thus, if the cells of the potato were examined when very young, the contained starch would be seen to consist chiefly of minute granules scattered amongst larger ones, whilst in the cells of old potatoes the two different sized granules were observed, but here the smaller granules were comparatively few in proportion to the larger. The smaller granules were nearly spherical in form, while the larger were ovate or more or less irregular in their outline; but it was observed that the inner zones of the larger granules were nearly spherical, corresponding in appearance with the small granules. From these facts it was inferred that the small granules became the nuclei of the larger, and that they were augmented in size by successive depositions of concentric layers from within outwards, the outer layers becoming gradually more irregular. The experiments of Dr. Allman tended to show, that if starch be left for several weeks in a dilute solution of iodine and then examined by the microscope, the appearance of concentric layers became more evident; and that on the addition of a drop of dilute sulphuric acid the granules immediately began to swell, and when the swelling had ceased the scales were found to be more or less separated from one another. It had also been found that when starch was heated on a metallic plate until

it began to assume a brown color, on examining the granules with the microscope the nuclei were observed to be enlarged and the striæ rendered more distinct, results which were ascribed to the action of vapor produced by the heat, within the cavities. Another experiment which had been tried consisted in mixing starch with gum-water, and after allowing the mass to dry, cutting it into very thin slices, when many of the granules were found to have been cut through, and on examining these sections with the microscope, especially after treating them with solution of iodine and dilute sulphuric acid, strong evidence of the existence of separate layers was obtained. By these and other experiments he thought it had been pretty clearly shown that the starch granule was composed of a series of hollow scales, and he believed with Schleiden and others, that these were deposited from within outwards. Another question, however, presented itself, namely, are the different layers in the granule of the same chemical composition, or of the same relative density? He considered that the layers varied in density, the inner layers being more aqueous and gelatinous than the outer, which appeared generally to be altogether of a tougher consistence. He thought the layers had all the same chemical composition in the larger and perfectly formed granules, but it might be doubted whether the small rudimentary granules did not consist of a transitional substance not identical with starch, but which would become starch.—*Transactions Pharm. Society, in Pharm Jour. Dec.* 1854.

NEW RESEARCHES ON STARCH.

By M. A. Béchamp.

During some researches on xyloidine, the author has studied the action of nitric acid, sulphuric acid, crystallizable acetic acid, chloride of zinc, and caustic alkalies upon starch. He considers that the insolubility of starch is not dependent upon its organization, and that the substance soluble in cold water, known to chemists as *dextrine colorable by iodine*, is a modification of starch intermediate between it and pure dextrine.

If starch be treated with very concentrated nitric acid (a mixture of equal parts of $NO^5\ 4HO$ and $NO^5\ HO$,) it is first of all converted into a thick paste, which at last dissolves in an excess of acid.* The addition of a sufficient quantity of concentrated alcohol separates the whole of the starch in the form of a sticky mass, which, when washed with alcohol, is reduced to a white powder, perfectly neutral to litmus paper. This substance is

* The liquid obtained is entirely soluble in cold water, so that no xyloidine can have been formed.

slightly soluble in cold water, but nine-tenths of it are insoluble in that fluid. But if the sticky mixture of starch and acid be left to itself for from forty-eight to sixty hours, or heated until the appearance of reddish vapors, it becomes completely liquefied, and the starch may still be entirely separated by concentrated alcohol. The product, washed with alcohol to remove adherent acid, is then completely soluble in cold water. In all cases both the soluble and insoluble matters acquire a blue color by iodine.

A thick mixture of starch and concentrated sulphuric acid, SO^3 HO, treated with alcohol after about four minutes contact, behaves exactly like the mixture of starch and nitric acid; the starch is entirely separated, and becomes partially soluble in cold water. But when the mixture is left for half an hour, the starch separated by the alcohol has become completely soluble in cold water.

Crystallizable acetic acid, heated to 212° F. with starch, in a sealed tube, converts it into the soluble modification in from three to five hours; the starch grains are not deformed or dissolved; they are merely split (but not exfoliated) in the region opposite to the tube. Ordinary acetic acid acts more quickly upon starch, and may convert it into dextrine under the same circumstances.

A concentrated solution of fused chloride of zinc, free from acid, converted starch into a paste in the cold. This paste liquefies in a few hours when heated to 212° F. The mixture may be heated to 284° F. without the formation of any trace of dextrine; but the starch separated from this zinc solution by alcohol may, according to the duration of the reaction, become entirely soluble in cold water.

Starch heated in *a very concentrated* solution of caustic potash or soda, loses the whole of its [?] nitrogen in the form of ammonia. The author confirmed this evolution of ammonia, not only by test paper, but also by converting this alkali into the double chloride of platinum and ammonium. When the caustic alkali is saturated with acetic acid, the addition of alcohol separates the whole of the starch. A small quantity has become soluble, but the greater part remains insoluble, not only in cold, but even in boiling water. Dextrine is never formed by the action of caustic

alkalies. The insoluble disorganized starch no longer forms a paste with hot water, but by the action of acids it may be converted into soluble starch, and afterwards into dextrine. The author's memoir contains details showing the insensible passage of insoluble starch to the state of soluble starch.

He considers that his experiments leave no doubt that starch is insoluble in all its parts, although formed of strata of different ages, the most recent being the most readily altered.

The following properties of soluble starch serve to distinguish it from dextrine :—

1. It is colored blue by tincture of iodine.

2. Tannic acid produces a precipitate with it, as in the apparent solution of ordinary starch.

3. It causes turbidity in lime water, and produces an abundant precipitate in baryta water. Carbonic acid separates it unchanged from its baryta compound.

4. Its molecular rotatory power is much greater, but in the same direction ; it is $[a]j = 210°$.

The solution of soluble starch passes pretty readily through the pores of an animal membrane.

If starch-paste be boiled in water and filtered, the filtrate will not contain more than 0·338 per cent. of starch. This solution becomes turbid when it is concentrated on the water-bath ; the starch separates, and the liquid when filtered does not contain more dissolved matter than before the evaporation. A solution of soluble starch, on the contrary, may be evaporated to a syrupy consistence without turbidity.—*London Chem. Gaz*, from *Comptes Rendus*.

ON THE OIL OF THE PURGING NUT (CURCAS PURGANS?)

By J. Bouis.

A plant of the family *Euphorbiaceæ*, which occurs in the West Indian Islands, produces fruits presenting certain analogies with those of the castor oil plant. These fruits, known as purging nuts, contain a kernel which tastes like a nut, but the very active properties of which are soon discovered when two or three of them have been eaten. During my experiments, several people

having seen and tasted them, experienced very disagreeable effects.

By pressure they furnish a white oil, the density of which is 0·910 at 62°·6 F.; it sets into a butyraceous mass at 20°·3 F.; it is inodorous, and I think may be substituted in perfumery for oil of ben, which it closely resembles; it is nearly insóluble in alcohol. It is sweet, and does not appear to produce the same effects as the fruit, at least when taken in small quantity; in the air it undergoes very little alteration, but when placed in a tube with oxygen, it absorbed that gas very slowly, and became perfectly white and limpid. The oil does not solidify completely under the influence of hyponitrous acid; it always retains a pasty consistency. It is saponified with difficulty by potash, but soda readily converts it into a white hard soap. Ammonia acts upon it as upon most oils, producing a solid white body, of which the properties will be referred to hereafter.

The proportion of oil contained in the nut is 37 per cent.; in the kernel it amounts to 50 per cent., and the envelope might easily be separated by bolting. The nuts contain 2·25 of nitrogen; the cake from which the oil had been expressed gave 4·56 per cent. of nitrogen.

By the action of heat this oil is decomposed, furnishing acroleine and different products, amongst which sebacic acid occurs. It is attacked by nitric acid, with evolutions of nitrous fumes and formation of hydrocyanic acid; the oil furnishes volatile fatty acids, and at last a white acid soluble in hot water, and fusible at 248° F. Analysis of this acid and of its silver salt show that it is suberic acid, $C^{16}\,H^{14}\,O^{8}$.

Saponified by potash, the oil gives a soap, which, when decomposed by muriatic acid furnishes fatty acids, which solidify at ordinary temperatures, and only fuse at about 86° F. By well regulated pressure, a very white solid acid may be separated, which is deposited from alcohol in brilliant spangles; it fuses at 131° F., and solidifies at 128°·3 F.; it amounts to 18 or 20 per cent. of the weight of the oil. Its analysis agreed exactly with the formula $C^{30}\,H^{30}\,O^{4}$, which was also confirmed by the analysis of its silver salt. The latter is but slightly soluble in water, but very soluble in boiling alcohol; it fuses when heated, and burns very readily, without diffusing any odor; it leaves a residue of metallic silver.

Several substances give rise to an acid presenting a similar composition, but varying either in their point of fusion or in their appearance. Thus, Walter extracted from oil of ben an acid which crystallized in granules, and fused at 125°–127° F. (*benic acid.*) Hardwick obtained from the oil of *Bassia longifolia* an acid of a waxy aspect, which was deposited from its ethereal solution in granular tubercles, and fused between 131°·9 and 133°·7 F. He represented it as C^{30} H^{30} O^4, and named it *bassic acid.* In the Chinese wax, Borck found an acid which fused at 141°·8–143°·6 F., and separated from alcohol in nacreous lamellæ; to this he gives the name of *stillistearic acid*, and ascribes to it the above composition. Lastly, Heintz, in examining spermaceti, obtained an acid of the same composition (*cetic acid,*) which crystallized in nacreous spangles, fusible at 128°·3 F. The acid examined by me having the closest analogy to cetic acid, I shall call it *isocetic acid.*

Isocetic Æther, obtained by the ordinary processes, is inodorous; it fuses by the heat of the hand, and solidifies at 69°·8, remaining perfectly transparent, but acquiring a crystalline texture. The numbers obtained by analysis agree with the formula—

$$C^{30}\ H^{29}\ O^3\ C^4\ H^5\ O.$$

The action of sulphurous acid upon the oil furnished a result which deserves mention, and which will assist in the explanation of the mode of action of this acid upon certain neutral fatty matters. A current of sulphurous acid was passed into the oil, and the whole left standing; at the end of three months a deposit crystallized in granules was found in the oil; this was separated, pressed and purified by alcohol. It is fusible at 136°·4 F., combines with bases to form salts, and is very soluble in alcohol; its composition is that of the solid acid of the oil, but its point of fusion is higher. The sulphurous acid must then become partially converted into sulphuric acid, and the latter will have produced a partial saponification. Acid saponification may therefore take place slowly in the cold, *without coloration*, under the influence of a small quantity of acid; and I need not insist upon the importance of this fact.

When the oil is treated with ordinary sulphuric acid, keeping the temperature at 230° F., the mass becomes black, evolves sul-

phurous acid, and furnishes a black elastic substance, known in the manufactories as *sulphoglyceric acid.* This substance, washed with water, and then distilled with a current of vapor, furnishes fatty acids, which form a crystallized mass.

When the oil is left in contact with ammoniacal alcohol for a month or two, crystals make their appearance on the sides of the vessel; these disappear, and their place is taken by a flocculent substance held in suspension in the alcoholic fluid. The oily stratum gradually diminishes, and at last disappears. The alcohol, when slowly evaporated, deposits a white matter, of which the point of fusion and the composition are not always the same. This result is arrived at more quickly in operating by heat in a closed vessel.

The substance purified by crystallization from alcohol is very white and pearly, and fuses at 152°·6 F. into a colorless transparent fluid. This substance is not acted upon by solution of potash; it is only decomposed by very concentrated potash, when ammonia is evolved, and a soap is formed which is but slightly soluble in water. From this muriatic acid separates a solid white acid. Its analysis led to the formula $\frac{C^{30} H^{31} O^2}{N}$, which represents the amide derived from isocetic acid, which I call *isocetamide*, $C^{30} H^{29} O^2, NH^2$.

Besides isocetic acid, the oil contains another liquid acid, which does not solidify at 13° F. It may be obtained by treating with ether the papers which have been used in pressing the mixture of acids, or by saponifying the oil with oxide of lead and treating the soap with ether, which only dissolves the lead salt of the liquid acid. This acid gave the composition of oleic acid.

The lead salt obtained directly by saponification with precipitated oxide of lead, has the composition $2\,(C^{36} H^{33} O^5)\,PbO, HO$.

That obtained by precipitation is represented by $C^{36} H^{33} O^5, PbO$.

It appears from what precedes, that the oil of the purging nut may be usefully employed in the arts, either in perfumery or in the manufacture of soap; and I have no doubt, that if, as is stated, the plant is very abundant in the West Indies, the production of the oil will become highly advantageous to those colonies.—*London Chem. Gaz.*, from *Comptes Rendus.*

ON THE LEAVES OF THE COCA OF PERU (ERYTHROXYLON COCA, LAMARCK).

By Dr. H. A. Weddell.*

(Continued from page 38.)

Let us now examine the properties of the Coca, after having glanced at the manner of employing it.

The Peruvian ordinarily keeps his coca in a little bag called *chuspa*, which he carries suspended at his side, and which he places in front whenever he intends to renew his *chique*, which he does at regular intervals, even when travelling. The Indian who prepares himself to *acullicar*, *i.e.* to chew, in the first place sets himself as perfectly at ease as circumstances permit. If he has a burden, he lays it down; he seats himself, then putting his *chuspa* on his knees, he draws from it one by one the leaves which are to constitute his fresh "quid." The attention which he gives to this operation is worthy of remark. The complaisance with which the Indian buries his hand in the leaves of a well-filled *chuspa*, the regret he seems to experience when the bag is nearly empty, deserve observation; for these little points prove, as I shall have occasion to repeat further on, that to the Indian the use of coca is a real source of enjoyment and not the simple consequence of want.

As the Indian deposits the leaves in his mouth he wets them by turning them over with the tongue, forming them into a sort of little ball, which he places against his cheek as a sailor does his tobacco. This done, he takes from his *chuspa* a little box which generally accompanies the coca, and removes from it a very small quantity of an alkaline paste, called *llipta*, which is the ordinary condiment to the leaf. The *llipta* which the Peruvians, and especially the Bolivians, are in the habit of using, is made of the ashes of the *Quinoa* (*Chenopodium quinoa*) or of those of the common *Cereus*. The ashes of several other plants, however, are used for the same purpose; they are often sold in the markets in the form of little flat cakes. In some parts of America lime is substituted for them.

* Extracted from Dr. Weddell's *Voyage dans le Nord de la Bolivie*. Paris, 1853, 8vo, ch. xxix.

From the constancy with which the Indians employ an alkali with the coca, one might presume that it favors the solution of the active matter of the leaf; but on this head we know nothing positive. Others have said that the *llipta* was intended to neutralize the acid* of the leaf; but it is easy to convince oneself that the coca contains no principle of this nature in appreciable quantity.

The leaves of the *Erythroxylon* approach in shape and size those of tea, but they have never the dentated margin; on the under side, a prominent and curved line on each side of the midrib serves to distinguish them from most other leaves known. When dried well, they are of a very pale green, deeper on the upper than on the under side; their odor is then agreeable and even analogous to that of tea. When, on the contrary, the coca has been dried less perfectly, this agreeable aroma is hardly perceptible, or rather is overpowered by a pungent odor, *sui generis*, recalling the abominal smell exhaled by the breath of the masticators of coca, which is, in fact, the odor in a concentrated state. The *bouquet*, if I may so term it, is very perceptible on tasting the coca, and serves, according to its abundance, in indicating its quality. On the other hand, in a concentrated infusion, and still more so in a decoction, it is a bitterness mixed with something styptic that more particularly strikes the palate.

As to the immediate physiological effects of this infusion, frequently repeated trials enable me to assert that they are in general limited to a slight excitement, succeeded in most cases by some degree of sleeplessness.

The questions relative to the effects resulting from the use of coca are less easily determined; we may begin, nevertheless, by stating that an immense majority of authors, both ancient and modern, who have written on the subject, have agreed in attributing to the coca-leaf thus employed, virtues whose well-ascertained existence would warrant it being placed among the mere

* Thus, Dr. Unanue speaking of the beneficial properties of the coca, says: "De la combinacion del alkali de la llipta con el acido de la Coca no resultara una sal neutra, una sal vegetal aperitiva y laxante que coopere en gran parte quando la Coca obra de este modo." Vide *Dissertacion sobre las virtudes de la famosa planta del Peru nombrada Coca.* Lima, 1794.

beneficial products of the vegetable kingdom ;† and such would doubtless remain the admitted opinion, had not a modern traveller completely shaken it, by supporting an opposite view, that is to say, in attributing to coca very pernicious effects, comparable in fact to those brought about by the excessive use of opium.

Such assertions in the presence of reports so opposite as those I have cited, may well cause some astonishment. Individuals are, however, not wanting, who give us to understand, that if this traveller had not trusted too implicitly to the accounts of ill-informed persons, he had erred at least, in too much generalizing exceptional facts. For my part, I may say, that the researches that I have been able to make on the subject, in localities where the coca is the most in use, have shown me that the mastication of the leaf does sometimes produce evil consequences among Europeans who have not accustomed themselves to it from youth; and, in two or three cases, I have thought I could attribute to the abuse of this practice a peculiar aberration of the intellectual faculties indicated by hallucinations. But in the countries which I have visited, on no occasion have I seen the results to reach the point instanced by M. Poeppig.

Let us now examine what are the beneficial properties attributable to coca. Of these the most remarkable is undeniably its reputed power of sustaining the strength in the absence of any other nutriment. The facts on which this opinion rests have been asserted by so many credible persons, that scepticism must be carried very far to throw over it a doubt; it appears to me, however, that opinions may vary according to the interpretation of the same facts.

One of two things is certain, either the coca contains some nutritive principle which directly sustains the strength, or it does

† "Quotquot Peruanam historiam scripserunt, referunt earum regionum incolas admodum delectari quarumdam radicum, ramusculorum, aut herbarum gestatoire in ore, ut Orientales suo Betre [*betel*] delectantur: præsertim verò familiarem esse (Petri Ciecæ testimonio) quandam herbam *Coca* illis dictam, quam à summo mane ad noctem usque perpetuò in ore retinent, tametsi neque eam mandant, neque deglutiant. Percontati cur eam assiduè in ore habeant, respondent ejus usu nec famem nec sitim sibi molestam, et vires roburque sibi confirmari."—*Clusii Exoticorum Libri—Aromatum Historiæ, lib.* 1, *cap.* xviii.

not contain it, and therefore simply *deceives* hunger while acting on the system as an excitement.

As to the existence of a nutritive principle in coca, I am far from wishing to deny it; analysis, indeed, shows the existence in the leaf, and especially in its active principle,* of a notable quantity of nitrogen, together with assimilable carbonized products; but the proportion of these substances is so small, compared with the total mass of the leaf, and especially with the quantity of it, that the Indian consumes in a given time, that they can hardly be taken into consideration. Moreover, I can affirm very positively that coca, as it is taken habitually, does *not* satiate hunger. This is a fact of which I have convinced myself by daily experience. The Indians who accompanied me on my journey chewed coca during the whole day; but evening arrived, they filled their stomachs like fasting men, and I am certain I have seen one devour as much food at a single meal as I should have consumed during two days. The Indian of the Cordillera is like the vulture of his mountains; when provisions abound he gorges himself greedily; when they are scarce, his robust nature enables him to content himself with very little. The use of coca assists, it may be, to support the abstinence; but we must have cases far more conclusive than those which I have witnessed, to convince me that it plays a part more important than that which I attribute to it. I will, however, add to what I have before said of the *llipta*, that this alkaline substance may also contribute by its direct influence on the secretions of the stomach, to allay the requirements of that organ.

The action of coca is then, in my opinion, confined to an excitement, but an excitement of a peculiar kind, which I consider as very different from that resulting from the use of most of the ordinary excitants, and especially of alcohol. Brandy gives

* From the sleeplessness induced by an infusion of coca, I at first thought it might contain theine, but the examination which I have made in following the processes recommended by M. Péligot, have negatived this supposition, and the same result has followed the more exact analyses which Professor Frémy has kindly made at my request. There nevertheless exists in coca a peculiar active principle, soluble in alcohol, insoluble in ether, very bitter, but which it has not hitherto been possible to obtain in crystals.

strength, as all know; but who does not know also that the "gift" is but a *loan* made out at the expense of strength reserved for the future? The action of this agent, though powerful, is transient. The stimulus produced by mastication of the leaf of the *Erythroxylon* is, on the contrary, slow and sustained, characters which it owes doubtless in great part to the manner of its employment, since an infusion of coca acts very differently from the leaf taken in the ordinary way. It will be said that tea and coffee, whose effects appear to have more analogy with those of coca, would perhaps produce analogous results if taken in the same manner. I do not believe that such would be the case. Tea and coffee (coffee in particular) act specially on the brain, on which they produce an antisoporific effect, but too well known to those who are not in their habitual use. But coca, while producing a little of this effect, when taken in large doses, as I have often experienced in my own person, does not act perceptibly upon the brain in small doses. To account for the ordinary effects of the leaf, one must then suppose that its action, instead of being localised, as in the case of tea and coffee, is diffused, and bears upon the nervous system generally, producing upon it a sustained stimulus, well suited to impart to those who are under its influence that support which has been erroneously attributed to peculiar nutritive properties.

Finally, I think that in the fidelity of the Indian to the use of coca, as with some smokers and their pipes, much is due to habit; and it is, I think, essential not to lose sight of the fact, that the force of habit must have an influence all the more powerful, since the habit in question is almost the only one he retains of past times, and that now, as then, he attaches to the use of the coca-leaf superstitious ideas, which, to his imagination, must at least treble the greatness of the benefits he derives from it. Lastly, that in the mastication of coca he finds the sole distraction that breaks the incomparable monotony of his existence.—*London Pharm. Jour. Nov.* 1854.

ON GENUINE THEOBROMINE.

By Dr. E. Keller.

When theobromine is carefully heated between two watch glasses, it forms a brilliant white sublimate, and leaves a small quantity of carbon behind. The substance thus sublimed may be re-sublimed without further alteration. The hydrochloric acid solution of this sublimate gave with chloride of platinum splendid golden-yellow crystals. An analysis of the sublimate, and a determination of the atomic weight, led to the formula $C^{14} H^3 N^4 O^4$.

The analyses of theobromine already published appear to have been made with the commercial article. This would account for the assertion, that it does not volatilize without decomposition. All the specimens of theobromine obtained in the way of trade, showed this carbonization more or less; and sometimes the sublimate was colored red, arising probably from the decomposition of some cinchotannic acid present.

The taste of sublimed theobromine is decidedly bitter, and different from that of the unsublimed.

This property of sublimation without decomposition, brings theobromine a step nearer to caffeine.—*London Chem. Gaz.*, from *Ann. der Chem. und Pharm.*

ON THE STEAROPTEN OF THE OIL OF THE PTYCHOTIS AJOWAN, AN UMBELLIFEROUS PLANT FROM THE EAST INDIES.

By John Stenhouse, LL.D, F.R.S.

A few months ago I obtained a quantity of this stearopten from the late Dr. Stocks, whose recent premature death has been such a loss both to science and to the medical service of the East India Company.

Dr. Stocks states that "this stearopten is not found in the bazaars of Scinde, but in the druggists' shops at Poonah and other large tows in the Deccan.

"It is called Ajowan Ka Phul (sublimed Ajowan), and is prepared from the grains or pericarps of the Ptychotis Ajowan, an umbelliferous plant, well known in India for its aromatic and carminative properties. It is made at Oojein and elsewhere, in Central India, during the cold season, and is said to form spon-

taneously on the surface of the distilled water of the Ajowan grains."

The stearopten forms very transparent and symmetrical crystals, some of which are more than a quarter of an inch long.

The crystals of the stearopten are heavier than water; their odor is very peculiar and pungent, somewhat resembling the oils of thyme and marjorum. Their melting point is 42° C., and they can be distilled over in a current of carbonic acid gas. After having been dried in vacuo they were analyzed in the usual way with chromate of lead.

I. 0.1613 grammes of substance gave 0.411 grammes of carbonic acid and 0.1372 grammes of water.

II. 0.22 grammes of substance gave 0.5555 grammes of carbonic acid and 0.1 grammes of water.

	Calculated.		Found.	
C_{44} =	264	69.84	69.49	68.86
H_{34} =	34	8.99	9.45	9.57
O_{10} =	80	21.17		
	378	100.00		

From these results, therefore, it follows that the empirical formula of the stearopten is $C_{44}\ H_{34}\ O_{10}$.

The stearopten is a perfectly neutral body, and neither combines with alkalies nor acids, but by boiling with strong acids or alkalies it is decomposed. The products of the decomposition have not yet been examined.

When a stream of chlorine gas was passed through the melted stearopten, it was rapidly absorbed, and so much heat was evolved that the vessel containing the stearopten required to be cooled.

The chlorine compound has a deep yellow color, and crystallizes in beautiful needles. The original stearopten is exceedingly soluble, both in alcohol and ether, but the chlorine compound is much less soluble in cold alcohol and ether, but tolerably soluble in hot alcohol. After having been several times crystallized out of alcohol, and submitted to pressure between folds of blotting-paper, it is rendered perfectly pure.

After having been dried in vacuo:

0.2485 grammes of substance gave 0.4185 grammes of chloride of silver.

0.423 grammes of substance gave 0.634 grammes of carbonic acid, and 0.154 grammes of water.

	Calculated.			Found.
C_{44} =	264	40.37	. . .	40.265
H_{26} =	26	3.97	. . .	3.988
Cl_8 =	284	43.43	. . .	43.094
O_{10} =	80	12.23	. . .	
	654	100.00		

The formula of the chlorine compound is, therefore, $C_{44} H_{26} Cl_8 O_{10}$.

If the action of the chlorine on the stearopten be continued longer than is necessary to produce the crystalline compound (which is usually formed in from two to three hours), it begins to be decomposed, being converted into an uncrystallizable resin.

Bromine acts readily on the stearopten, but the combination which it forms with it is not crystallizable.

When the stearopten was digested with nitric acid it temporarily assumed a deep green color, and was changed into a deep yellow resinous substance, which was but slowly acted upon by nitric acid; but by long-continued digestion in nitric acid colorless crystals were produced, which were not oxalic acid; but the quantity obtained was too small to enable me to submit them to further examination.

Hydrochloric acid has no action upon the stearopten.

The stearopten cannot be distilled over anhydrous phosphoric acid unchanged, but is converted into a green substance soluble in alcohol, and precipitated from this solution by water in the form of a dark green thick liquid, having an acid reaction, and not crystallizable either in the free state or combined with potash.—*Pharm. Jour.*, Dec. 1854.

ACONITIC ACID IN DELPHINIUM CONSOLIDA.

By W. Wicke.

Aconitic acid has been found in *Aconitum napellus*, *A. stærkianum*, *Equisetum fluviatile*, and *E. limosum* (and at first called

equisetic acid). Berzelius pointed out that the relation between aconitic and citric acids is the same as that between fumaric and malic acids, Robiquet having found that by dry distillation citric acid yielded aconitic acid.

From the close relation between aconitum and delphinium, and from the opinion that a morphological resemblance between plants indicates similar productive agency, the author considered it probable that aconitic acid exists in the latter, and the result of his examination proved that his conjecture was well founded. The herbaceous part of the plant, after flowering, was submitted to examination.

The expressed juice was boiled for about half an hour to separate albumen and chlorophyle, strained, oxalic acid added to separate lime, the filtrate treated with acetate of lead; the lead salt decomposed by sulphuretted hydrogen, and these two operations repeated until a tolerably colorless liquid was obtained. It is extremely difficult to separate the coloring substances.

This liquid, evaporated to dryness, was treated with ether, when the aconitic acid was obtained on evaporation in the characteristic form of warty masses of crystals. The crystals were readily soluble in alcohol and water. When heated in a tube there distilled off drops of liquid which crystallized (itaconic acid) and a voluminous coal remained.

The analysis of the silver salt gave 69.57 per cent. oxide of silver. Calculation gives 69.21 per cent.—*Pharm. Jour. from Annalen der Chemie und Pharmacie*, April, 1854.

INFLUENCE OF THE POISON OF THE NORTHERN RATTLESNAKE —(CROTALUS DURISSUS)—ON PLANTS.

By J. H. Salisbury, M. D.

It is a curious and well known fact, that some of our most deadly poisons are animal secretions, and that the very animals —the very tissues which secrete these powerful proximate organic principles, are as susceptible to their deleterious influence, when introduced into their circulation, as the tissues of the most harmless animal would be under similar circumstances. It is also well known that many vegetable products are highly poi-

sonous to animals. But the influence of animal and vegetable poisons upon plants, has—although a subject scarcely less interesting in a physiological point of view—excited but little attention. The simplicity of the plant's structure renders the field one of peculiar interest, in the way of studying the general action of medicinal agents and poisons upon organized tissues.

On the 18th of June, 1851, a large female rattlesnake, which had been caged in the N. Y. State Cabinet of Natural History, for about a year, without food, died. On dissection, its stomach and intestinal canal were found entirely empty. The sac into which the poison is emptied was laid open, and the virulent matter (of which there was little), carefully removed and placed in a porcelain capsule. About fifteen minutes after its removal, four young shoots of the lilac, *Syringa vulgaris*, a small horse-chesnut of one year's growth—*Aesculus hippocastanum*, a corn plant—*Zea Maize*, a sunflower plant—*Helianthus annuus*, and a wild cucumber vine, were severally vaccinated with it. The vaccination was performed by dipping the point of a pen-knife into the poisonous matter and then inserting it into the plant just beneath the inner bark. No visible effect, in either case, of the influence of the poison was perceptible till about sixty hours after it had been inserted. Soon after this the leaves above the wound, in each case, began to wilt. The bark in the vicinity of the incision exhibited scarcely a perceptible change; in fact it would have been difficult to have found the points, if they had not been marked when the poison was inserted. Ninety-six hours after the operation, nearly all the leaf-blades, in each of the plants, above the wounded part were wilted, and apparently quite dead. On the fifth day the petioles and bark above the incisions began to lose their freshness; and on the sixth they were considerably withered. On the seventh day they appeared about as they did on the sixth. On the tenth they began to show slight signs of recovery. On the fifteenth, new, but sickly appearing leaves began to show themselves on the lilacs, and the other plants began to show slight signs of recovery in the same way. Neither of the plants were entirely deprived of life.

It was interesting to mark the progressive influence of the poison. The first indication of the derangement of the healthy

functions of the plants was observed in the leaves: these began to wilt and die at their edges and apices; and this death gradually and uniformly advanced on all sides towards the midrib and petiole, till the whole, or nearly the entire leaf-blade was destroyed.

It is an interesting fact in physiology, that the plants first exhibited signs of death in the leaves; and still more interesting, that this death commenced first in the leaves on the side of the plant in which the poison was inserted.*

The facts materially deducible from these experiments are:—

1. That the effects of the poison of the rattlesnake upon plants and animals, when introduced into the circulation by a wound, are similar.†

2. That it requires a much longer time for it to affect the plant than the animal.‡

3. That the effects were invariably exhibited on the parts above the wound, and in no case effected the leaves below it.§

4. That it invariably affected first the leaves on the side of the plant in which the incision was made.

5. That its influences were first rendered visible on the edges and apices of the leaf-blades.—*N. Y. Jour. of Med., Nov.*, 1854.

ON AN EASY METHOD OF PREPARING ATROPINE.

By W. T. Luxton, M. R. C. S., L. A. C.,
Late House-Surgeon to King's College Hospital, London.

This alkaloid, which is of such immense value to the ophthalmic surgeon, and which, I think, will become of almost equal

* This shows a less perfect system of anastomosing vessels than exists in the animal.

† It is stated on good authority, that the poison of the snake can be taken into the stomach of the animal with impunity; its dangerous effects being only exhibited when introduced into the circulation by a wound. It would be interesting to note its influence on the animal when applied externally, to the skin, to see whether its deadly effects would be modified by the absorbents.

‡ It should be stated, in order to show that animals were readily affected by the poison of the snake, that a short time previous to its death, a rat bitten by it died in two hours.

§ This was probably owing to the small quantity of poison inserted in each case.

importance to the general physician, is generally, I believe, procured from the *root* of the Atropa belladonna by digestion in alcohol, so as to form a tincture, to which lime is added to precipitate the atropine, then sulphuric acid is dropped in in slight excess, and the sulphate of lime so formed separated by filtration. A portion of the filtered fluid is then distilled off, water added, and the rest of the spirit driven off by evaporation. Carbonate of potash is now added to precipitate the alkaloid, which is to be collected, dried, and again dissolved in alcohol; water is again added, and it is lastly evaporated and crystallized. 1000 parts of root are stated to yield three of the alkaloid (*vide* Brandes' *Chemistry*.)

Now as this is at the best a very tedious process, as well as expensive on account of the time and spirit which are consumed, perhaps I may be pardoned for offering a more simple but equally efficacious one to the notice of this Society. It nearly resembles the original method of M. Brandes, the discoverer of the substance in question, but differs from it in the circumstance that he precipitated the atropine with liquor potassæ, I with liquor ammoniæ.

A pound of the dry leaves of the belladonna are to be boiled in distilled water sufficient to cover them, for two hours, and the decoction strained off through a coarse cloth into a large precipitating jar. The leaves are again boiled in a second water and the decoctions mixed, to which two drachms of strong sulphuric acid are now added; the vegetable albumen is precipitated, and the clear liquor is drawn off with a syphon to a filter. A clear sherry-colored solution comes through, which is either decomposed by passing gaseous ammonia through it, or by suspending in it a lump of sesquicarbonate of ammonia. In either case, the color becomes changed to black, and crystals of atropine are slowly formed. At the expiration of a day or so, the supernatant liquor may be drawn off with a syphon, and the crystals thrown on a filter to dry.

To decolorise them, about an ounce of spirit of ammonia may be poured on the filter, which washes away most of the coloring matter, leaving the crystals *moderately* white.

By this process I have generally obtained about forty grains from a pound (avoirdupois) of leaves, which gives $5\frac{5}{7}$ grs. to 1000 of plant, instead of 3 to 1000.

I have thus endeavored to describe what seems to me an easy mode of obtaining an agent by which I have been fortunate enough to cure several cases of tic-doloreux (details of which may be forwarded if desired;) for which purpose I dissolve an equivalent of atropine in dilute nitric acid, and paint the face at the affected spot with it, until the pain is subdued. This usually occurs in about three to five minutes. The relief experienced is in some cases only temporary, and requires a second and even a third or fourth application, but in many it has proved permanent.

I do not intend for a moment to pretend that it will cure those cases which owe their origin to intra-cranial causes; but in those which are produced by exposure to vicissitudes of temperature and other eccentric causes, I have no reason to doubt its superior efficacy over every other known agent. The nitrate of atropine not being crystallizable, the solution may be made of any strength. The following answers very well:—Add two grains of atropine to one minim of strong acid, sp. gr. 1.5, and to this add one drachm of distilled water.

One point which I think deserving of notice in the above process is, that as the caustic alkalies convert atropine into ammonia, the volatile alkali is far preferable as a precipitating agent.—*Trans. Pharm. Society, in London Pharm. Jour.* 1855.

Sutton Benger, Wilts, Nov. 10, 1854.

ON THE BARK OF GOMPHOSIA CHLORANTHA, WEDD., OCCURING MIXED WITH QUILLED CALISAYA BARK.

By John Eliot Howard, Esq.

In continuation of the series of barks which I have deposited in the Museum in the Pharmaceutical Society, I now send a specimen recently obtained in commerce of the bark of *Gomphosia chlorantha*, of Weddell.

This tree, according to Weddell,* "characterizes, up to a certain point, the vegetation of the localities which it inhabits. Its bare and silvery trunk, which in general surpasses in height (without ramifications) all the rest of the forest, and its top, in

*Histoire Naturelle des Quinquinas, p. 97.

the form of a chandelier, attract the attention of the traveller at a distance." "It grows abundantly in Carabaya, at the same height as *Cinchona Calisaya*," and presents so deceptive a similarity to that valuable tree in the general appearance of its bark, that a considerable quantity mixed with Calisaya, recently passed in the London market as *Calisaya Quill of a superior quality*, and obtained a corresponding price.

The bark of *Gomphosia chlorantha* does not contain a particle of any alkaloid, but yields a notable quantity of essential oil possessing the peculiar fragrance of the bark in a concentrated form.

I first identified this bark with a specimen which I had received from Dr. Weddell, and which he had collected himself. I also transmitted to this distinguished naturalist a portion of the bark recently imported, which he recognized as corresponding with his own specimens. Its most distinctive peculiarity is shown by the microscope, a transverse section disclosing a peculiar fasciculate disposition of the cortical fibres, and some vessels gorged with a ruby-colored juice. The tree, though botanically very nearly allied to the *Cinchonæ*, thus differs wholly in its properties from that genus, and is calculated to deceive by its resemblance to a more valuable product of the forests of New Granada and of Peru.—*Lond. Pharm. Jour. Jan.* 1855.

ON THE MEDICINAL PREPARATIONS OF GLYCERIN.

By Cap and Garot.*

The authors have made many experiments about the solubility of certain medicinal substances in glycerin, from which they derive great confidence regarding the value of such solutions in external applications. They even believe it to be a good vehicle for some preparations intended for internal use, provided, however, that the harmlessness of glycerin be demonstrated, if taken internally. The advantages of using glycerin as a solvent and excipient are manifold. Its solvent power very often equals that of water or alcohol, and even is sometimes greater; it can be mixed with alcoholic and aqueous solutions, it is not subject to

* Translated and abridged from the Journal de Pharmacie, for August, 1854, by J. M. Maisch.

changes, particularly it does not become rancid; its preparations may be used like any oily embrocation; they will be readily absorbed by the skin, which afterwards may be washed with a little water; wounds after they have been dressed with such a preparation, may easily be washed out with warm and even cold water; chirurgical instruments can be cleaned with much less difficulty.

The glycerin that has been used by the authors is of 28° aerometer, and contains about 12 per cent. of water; for the preparations therewith they propose the name of glyceroles. Their first object was to ascertain the degree of solubility in glycerin of the different medicinal preparations, the results of which, as compared with their solubility in water, alcohol and oil, we give in the following table, — signifying insoluble, 0 decomposition.

Name of bodies.	Soluble in parts of Glycerin.	Alcohol.	Water.	Oil.
Sulphur,	2000	—	—	
Sulphuret of potassium,	10		2	
" calcium,	10		500	
Iodine,	100	20	7000	110
Iodide of sulphur,	60	0	—	82
" potassium,	3	5.55	1.33	—
Biniodide of mercury,	340	200	—	—
Proto-iodide,	—	—	—	—
Corrosive sublimate,	14	2.50	17	—
Calomel,	—	—	—	—
Quinine,	200	6	—	62
Sulphate of quinia,	48	45	740	—
Tannin,	6	0.50	1	—
Tannate of quinia,	130	52	—	1200
Morphiæ,	—	50	—	—
Muriate of morphia,	19	40	20	800
Strychnia,	300	120	6667	200
Nitrate of strychnia,	26	70	50	100
Veratria,	96	1.50	1000	100
Brucia,	70	1.50	850	120
Atropia,	50	2	350	35
Tartar emetic,	30	—	14	—

The solutions of the sulphurets must be kept excluded from the air; on addition of water only, they exhale the smell of sulphuretted hydrogen. The solutions of iodine and iodide of sulphur have a smell resembling that of saffron. An addition of water precipitates some iodide of mercury.

When heated glycerin dissolves 1-40th of sulphate of quinine,

forming on cooling a transparent gelatinous mass. With 6 parts of glycerin, the mass deposits a part of the sulphate in warty crystals, which after the whole being rubbed in a mortar, form a kind of cerate.

By the aid of heat tannin may be dissolved in 4 parts of glycerin; the solution is thick and cannot be filtered through paper.

One part of muriate of morphia may be made into a sort of cerate with 5 parts of glycerin.

Sugar is in glycerin soluble only to 1-10th part, on account, as it seems, of the water contained in it.

5 parts of glycerin and 1 of gum arabic form a transparent mucilage; 1 part of glycerin to 3 parts of powdered gum arabic unite to a thick mass, which, when spread, adheres well and is very flexible; a few drops of glycerin added to the court plaster mass makes it pliant and prevents the spread plaster from cracking.

Glycerin mixed with an equal part of tar and strained, forms a tar glycerole of a dark amber color, strong smell, and oily consistency, serviceable, perhaps, in certain diseases of the skin.

Equal parts of gum ammoniac and glycerin unite to the consistency of plaster, 1 part of the first to 7 of the latter to a cream-like glycerole, which may be strained through linen, and after months standing does not separate.

Camphor is soluble only in 400 parts of glycerin, but more after it has been rubbed up with alcohol or ether.

Starch and glycerin in equal quantities form a sort of pomade, which may be mixed with salts, alkaloids, soaps, extracts, tar, &c. The same results form 1 part of powdered althæa to 3 parts of glycerin.

The authors believe that fats extracted from fresh herbs little more than chlorophyll, wax, aromatics, and coloring matter, whilst glycerin would dissolve gum, sugar, tannin, extractive matter, watery juices, alkaloids and the aroma. It also dissolves the aqueous and alcoholic extracts in considerable quantity. 1 part of it added to fifty parts of collodion impart to this preparation flexibility and elasticity.

The general results of these experiments are:—

1. The solvent power of glycerin lies between that of water and alcohol.

2. Substances are in general the more soluble in glycerine, the more they are so in alcohol, with some exceptions, however.

3. In most cases alcohol is a better solvent than glycerin, nitrate of strychnia excepted.

4. Glycerin is a soft, mild solvent, deserving the preference to alcohol in many cases of external application.

5. Independent of the water it contains, glycerin of itself has solvent powers, as there are some substances soluble in it that are insoluble in water, and *anhydrous* glycerin dissolves iodide of potassium as well as that of 28°.

ON COPALCHE BARK.

By John Eliot Howard, Esq.

I beg to present to the Pharmaceutical Society a specimen of Copalche Bark, the produce, according to Pereira, of *Croton Pseudo-China*, and described by him in his *Elements of Materia Medica*, vol. ii., pt. 1, p. 1283. It is part of a recent importation of about sixty bales, brought from Puntas Arenas, in the gulf of Nicoya. From the situation of this port, it is probable that the bark is the produce of some part of Costa Rica. The specimen is evidently identical with Pereira's specimen of *Quilled Copalche*, which is deposited in the Museum of the Society. The odor in burning is that of Cascarilla, and in both these specimens the appearance of the singularly indented, resinous-looking derm where denuded (especially when observed with a magnifying glass,) is a highly characteristic feature of the species. It appears, as Pereira indicates, to be the sort figured by Goebel and Kunze,* and ascribed (owing to a suggestion of Humboldt) to the *Croton suberosum*. This is more probably the origin of Pereira's *Corky Copalche bark*, which was described by my friend Dr. Stark, in 1849, from specimens which I had the pleasure of forwarding to him. This latter kind is corky in the extreme, which is not the case with the *Quilled Copalche* now before us.

* Goebel and Kunze *Pharmaceut. Waarenk.*

The feature which is most interesting in the chemical examination of the bark, is the presence of a bitter alkaloid, soluble in ether, and precipitable as a white hydrate, from its solution in acid; of this I have assured myself by two experiments, guarding very especially against the possibility of mistake from any source. The bark contains, in addition, a large percentage (6 per cent.) of fragrant wax, as well as some fatty matter. Brandes obtained from the *Croton Tiglium* a crystallizable substance which he called *Crotonin*, and thought to be a peculiar alkaloid, but this was brought into question by Weppen, who found only a magnesian soap with an alkaline reaction.† The alkaloid which I have obtained, *yields a deep green color with chlorine and ammonia.* The proportion in the bark is about 0.05 per 100 parts. The taste is not unlike that of quinine; but it appears to differ from this alkaloid in being (apparently) crystalline, and in not affording under the microscope the appearance which Herapath has so well indicated as *the test* for quinine,—neither does it answer to quinidine. It deserves further examination.—*London. Pharm. Jour. Jan.* 1855.

MANUFACTURE OF PRUSSIATE OF POTASH.

Mr. Watson, of Leeds, has lately suggested some improvements in apparatus for the manufacture of prussiate of potash. These improvements consist in so constructing, arranging, and combining apparatus with the iron pots, in which the animal matter is combined with the fused potash, that such animal matter may be introduced into the pots through a tube or passage communicating with the lower part of the pots, and in connecting with the pots another and smaller vessel, in such manner as to be heated by the same fire, for the purpose of fusing the potash previous to introducing it into the pots, and having this smaller vessel so connected with the pots, that the fused potash can be conveniently admitted from the smaller into the larger vessel; or such smaller vessel so placed in connexion with the larger vessel, that it may be heated by the same fire, and moveable in such manner that the fused potash may be transferred out of it into the larger vessel. Also, in connecting a pipe or tube with such pots or

† Pereira, *Elem. of Mat. of Med.*, ed. 3., vol. ii., part 1, p. 1274.

vessels, in which the animal matter and potash are mixed, to convey the gases evolved during the operation into suitable condensing and other apparatus, by means of exhausting apparatus, with valves so constructed, that when these gases cease to be evolved, the communication will be shut off between the vessels and exhausting apparatus.—*Annals of Pharmacy*, Dec. 1854.

ON THE SO-CALLED OIL OF CINNAMON LEAF FROM CEYLON.

By JOHN STENHOUSE, LL. D., F. R. S.

For the last ten or twelve years, considerable quantities of cinnamon leaf oil have been imported from Ceylon into Great Britain. The cinnamon leaf oil of commerce is of two qualities, one of which is adulterated with a considerable quantity of a fixed fatty oil, but the other, which sells at a much higher price, consists wholly of essential oil.

Little is known with certainty of the origin of this oil. Dr. Pereira, in the last edition of his *Materia Medica*, page 1308, states: "That he was informed by a gentleman on whose estate in Ceylon this oil is obtained, that it is procured by macerating the leaves of the cinnamon-tree in salt water, and afterwards submitting to distillation."

The quantity of cinnamon leaf oil on which I operated, was kindly given me by Messrs. Quincy and Son, Billiter Street, City. It had been in their possession from two to three years.

Oil of cinnamon leaf, both in its appearance and properties, very closely resembles the oils of cloves and pimento. It has a brownish color, and a specific gravity of 1.053. Its smell is aromatic and penetrating. Its taste is exceedingly pungent. It has an acid reaction, and when treated with solutions of potash or ammonia, it solidifies, forming a butyraceous crystalline magma. Like clove and pimento oil, it is essentially a mixture of eugenic acid and a neutral hydro-carbon, having the formula $C_{20}H_{16}$. Cinnamon leaf oil is remarkable, however, for containing a small quantity of benzoic acid.

When the crude oil was distilled, a colorless oil came over, while the residue in the retort became gradually darker. The last portions of the oil which passed over, on being set aside for some time, deposited crystals which had all the appearance and

properties of benzoic acid. Their quantity was, however, so very small, that they could not be subjected to analysis. I at first suspected these crystals to be cinnamic acid, but I soon found this was not the case, for on treating them with a hot solution of hypochlorite of lime, they did not give the very characteristic reaction of cinnamic acid, namely, the production of that singular chlorinated oil which is always produced when cinnamic acid is treated in this way. That these crystals were really benzoic acid, was ascertained as follows:—When the last portions of the oil which had come over, together with the residue remaining in the retort were digested with strong nitric acid, along with much oxalic acid, a small quantity of another kind of crystals were obtained, which in appearance and properties agreed perfectly with nitro-benzoic acid. They were carefully purified and subjected to analysis.

0.1125 grammes gave 0.2095 grammes of carbonic acid, and 0.0305 grammes of water.

The calculation for nitro-benzoic acid (C_{14} H_5 (NO_4) O_4) requires—

	Theory.	Found.
C_{14} = 84	50.29	50·79
H_5 = 5	3.00	3.91
N = 14	8·38	—
O_8 = 64	38.33	—
167	100.00	

Of the silver salt of this acid, 0.12 grammes gave 0.046 grammes of silver, corresponding to 38.33 per cent.; theory requires 38.32.

The first portions of the colorless oil which distilled over were again rectified, when the boiling point was by no means constant, though the greater portion of the oil came over at a temperature approaching the boiling point of eugenic acid.

The oil was treated with an excess of potash, and the hydrocarbon which did not combine with the alkali, was drawn off by a pippette. It was next treated with fused potash, then with chloride of calcium, and lastly rectified over potassium. In this way a colorless, highly refractive liquid was obtained, the greater portion of which distilled over between 160° and 165° C. Its

specific gravity was 0.862, and its smell closely resembling that of cymene. The results of its analysis agree exactly with the formula C_{20} H_{16}.

	Theory.		Found.
C_{20} =	120	88·24	88.14
H_{16} =	16	11.76	11·68
	136	100.00	99.82

The portion of the oil which dissolved in potash lye (the eugenate of potash) was heated for a considerable time with agitation, in order to drive off the last portions of the hydrocarbon which might be adhering to it.

It was next saturated with sulphuric acid and the liberated eugenic acid still further purified. It agreed perfectly in its characters with those ascribed to eugenic acid by the Chemists, Bonastre, Ettling, and Boeckmann, who have examined eugenic acid. Its boiling point was found to be 242° C., and its specific gravity 1.076.

The results of its analysis agreed very closely with those of former experimenters.

I. 0.3290 grms. gave 0.8715 grms. of carbonic acid, and 0.2135 grms. of water.

II. 0.2645 grms. gave 0.6895 grms. of carbonic acid, and 0.1765 grms. of water.

	Theory.		Found.	
C_{24} =	144	72.36	72.24	72.02
H_{15} =	15	7.54	7.21	7.41
O_5 =	40	20.10	20.55	20.57
	199	100.00	100.00	100.00

Lond. Pharm. Jour. Jan. 1855.

ON THE IDENTITY OF PEUCEDANINE WITH IMPERATORINE.

By R. Wagner.

The author prepared imperatorine according to Wackenroder's process, by the extraction of the root of *Imperatoria Ostruthium* with ether. After the volatilization of the ether, the imperatorine separates. It is rendered purer by recrystallization from ether and cold alcohol, in which the fatty oil is only slightly

soluble, but it still retains a burning taste. The author therefore boiled it with thick milk of lime, when a lime-compound is produced, which forms caseous flakes; this is decomposed by acetic acid, and the imperatorine, which is precipitated in brown flakes, is purified by recrystallization from cold alcohol. It is then perfectly tasteless.

The author afterwards gives the following process of his own for the preparation of imperatorine, by which a greater proportion is obtained. In this way he prepares imperatorine both from the root of *Imperatoria Ostruthium* and from *Peucedanum officinale*. For this, 1 kilogrm. of finely-cut air-dried root is extracted, in a displacement apparatus, with 3 litres of alcohol of spec. grav. 0·876, at the ordinary temperature. Through the extracted root 1 more litre of alcohol is then passed; and this is followed by a litre of water, so as completely to remove the alcohol. The extracts are mixed and evaporated on the water-bath, or in a retort, at a temperature of about 140° F., until about 1 litre of fluid remains. The fluid, when left to stand, separates into two strata,—a thicker, pale brown, watery one at the bottom, which has a sweet and aromatic taste; and a superior resinous one, of a brown color. The latter is separated from the watery stratum, and placed in a broad porcelain saucer. In a few days it becomes converted into a granular crystalline mass, which is pressed between blotting-paper to remove the fatty oil, which has the greatest affinity to linseed oil, acquires a yellow color with potash, at the same time evolving the characteristic odor of linseed-oil. The granular mass thus obtained is purified by treatment with milk of lime and recrystallization from cold alcohol. In this process only a small quantity of the fatty oil is dissolved; this being a good solvent for imperatorine, produces a loss.

The watery fluid contains besides a great deal of grape-sugar, a small quantity of a nitrogenous body, which when heated with potash evolves an odor like that of coniine.

The author has compared the product prepared by him with a sample sent to him by Prof. Wackenroder; the differences which occur in the properties attributed to peucedanine and imperatorine arise from adherent impurities. The pure substance is tasteless. Prof. Wackenroder has informed the author that im-

peratorine can only be prepared from old roots of *Imperatoria;* and this the author has found to be perfectly correct. In operating upon strong-smelling fresh roots, the author never obtained anything but a sticky mass, without any trace of crystallization, and it was only by employing old roots that he procured crystallized imperatorine. This circumstance seems to indicate that that ethereal and fatty oils contained in such abundance in the fresh roots assist in the formation of the crystallized imperatorine. The analysis of imperatorine gave,—

Carbon	70·06	70·21	24	70·50
Hydrogen	6·19	6·48	12	5·89
Oxygen	—	—	6	23·52

Peucedanine is resolved, by treatment with alcoholic solution of potash, into angelicic acid and oreoseline.—*Chem. Gaz. Nov.* 1, 1854., *from Jour. für Prakt. Chem.* lxii. p. 275.,

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ON CHARCOAL AS A DISINFECTANT.

Being a Letter to the Editor of the "Times," as published in that Journal on the 22d November, 1854.

By Dr. John Stenhouse, F.R.S.

Lecturer on Chemistry at St. Bartholomew's Hospital, London.

The great efficacy of wood and animal charcoal in absorbing effluvia and the greater number of gases and vapors, has long been known.

Charcoal powder has also, during many centuries, been advantageously employed as a filter for putrid water, the object in view being to deprive the water of numerous organic impurities diffused through it, which exert injurious effects on the animal economy.

It is certainly somewhat remarkable, that the very obvious application of a perfectly similar operation to the still rarer fluid in which we live—namely, the air, which not frequently contains even more noxious organic impurities floating in it than those present in water, should have, up till February last, been so unaccountably overlooked.

Charcoal not only absorbs effluvia and gaseous bodies, but, especially when in contact with atmospheric air, rapidly oxidizes

and destroys many of the easily alterable ones, by resolving them into the simplest combinations they are capable of forming, which are chiefly water and carbonic acid.

It is on this oxidizing property of charcoal as well as on its absorbent power that its efficacy as a deodorizing and disinfecting agent chiefly depends.

Effluvia and miasmata are usually regarded as highly organized, nitrogenous, easily alterable bodies. When these are absorbed by charcoal, they come in contact with highly condensed oxygen gas, which exists within the pores of all charcoal which has been exposed to the air, even for a few minutes; in this way they are oxidized and destroyed. My attention has been specially directed for nearly a twelvemonth to the deodorizing and disinfecting properties of charcoal, and I have made an immense number of experiments on this subject.

On the 22d of February last I brought the subject before the Society of Arts, and on that occasion exhibited a specimen of a charcoal respirator, and the mode of employing it. I likewise dwelt at some length on the utility of charcoal powder as a means of preventing the escape of noxious effluvia from churchyards, and from dead bodies on board ship and in other situations.

On the 9th of June last I also, in a letter to the Society of Arts, proposed to employ charcoal ventilators, consisting of a thin layer of charcoal enclosed between two sheets of wire gauze, to purify the foul air which is apt to accumulate in water closets, in the close wards of hospitals, and in the impure atmospheres of many of the back courts and mews-lanes of large cities, all the impurities being absorbed and retained by the charcoal, while a current of pure air alone is admitted into the neighboring apartments.

In this way pure air is obtained from exceedingly impure sources. Such an arrangement as this, carried out on a pretty large scale, would be especially useful to persons necessitated to live in pestiferous districts within the tropics, where the miasmata of ague, yellow fever, and other diseases are prevalent.

The proper amount of air required by houses in such situations might be admitted through sheets of wire gauze or coarse canvas, containing a thin layer of coarse charcoal powder.

Under such circumstances also pillows stuffed with powdered

charcoal, and bed coverlets having the same material quilted into them, could not fail to prove highly beneficial.

A tolerably thick charcoal ventilator, such as I have just described, could be very advantageously applied to the gully-holes of our common sewers, and to the sinks in private dwellings, the foul water in both cases being carried into the drain by means of tolerably wide syphon pipes, retaining always about a couple of inches of water.

Such an arrangement would effectually prevent the escape of any effluvia, would be easy of construction, and not likely to get soon out of order.

The charcoal respirators to which I have already referred, and to which I should wish to draw especial attention, are of three kinds.

The first form of the respirators is constructed for the mouth alone, and does not differ in appearance from an ordinary respirator, but is only half its weight, and about one-fifth of its price.

The air is made to pass through a quarter of an inch of coarsely powdered charcoal, retained in its place by two sheets of silvered wire gause covered over with thin woollen cloth, by which means its temperature is greatly increased. This charcoal respirator possesses several advantages over the respirators ordinarily in use :—

1st. Where the breath is at all fetid, which is usually the case in diseases of the chest, under many forms of dyspepsia, &c., the disagreeable effluvia are absorbed by the charcoal, so that comparatively pure air alone is inspired. This, I think, may occasionally exert a beneficial influence on diseases of the throat and lungs.

2d. The charcoal respirator for the mouth alone will certainly prove highly useful in poisonous atmospheres, where miasmata abound, if the simple precaution is only observed of inspiring the air by the mouth and expiring it by the nostrils.

The second form of respirator is ori-nasal—that is, embracing both the mouth and the nose. It is only very slightly larger than the one already described, and does not cover the nose as the ordinary ori-nasal respirator does, but merely touches its lower extremity, to which it is adapted by means of a piece of flexible metal covered with soft leather. When this respirator is

worn, no air enters the lungs without first passing through the charcoal, and any effluvia or miasmata contained in the atmosphere are absorbed and oxidized by the charcoal. This form of the respirator, therefore, is peculiarly adapted for protecting the wearer against fevers and other infectious diseases.

The third form of the respirator is also ori-nasal, but is much larger, and therefore more cumbrous than the preceding variety. It is intended chiefly for use in chemical works, common sewers, &c., to protect the workmen from the noxious effects of the deleterious gases to which they are frequently exposed.

I think it but justice to myself to state, that I have no pecuniary interest in any of these respirators. Though strongly urged to do so, I refrained from securing them by patent, on the ground that inventions for the prevention of death and disease ought to be sold at the lowest price, and should not, therefore, be encumbered with the expense and restrictions attendant upon patent rights. These respirators have been very successfully manufactured by Mr. W. B. Roof, of 8, Willow Walk, Kentish Town, who sells the one for the mouth alone at 6*s*.; the small ori-nasal at 8*s*.; and the large ori-nasal at 10*s*. each.

I am aware that some persons, who admit the deodorizing properties of charcoal, deny that it acts as a disinfectant. I would direct the attention of such persons to the following statement of facts:—About a year ago the bodies of a full-grown cat and two rats were placed in open pans, and covered by two inches of powdered charcoal. The pans have stood during all that time in my laboratory, and though it is generally very warm, not the slightest smell has ever been perceptible, nor have any injurious effects been experienced by any of the nine or ten persons by whom the laboratory is daily frequented.

Now, had the body of these animals been left to putrify under ordinary circumstances, not only would the stench emitted have been intolerable, but some of the persons would certainly have been struck down by fever or other malignant disorders. Within the last few months charcoal powder has been most successfully employed both at St. Mary's and St. Bartholomew's Hospitals, to arrest the progress of gangrene and other putrid sores. The charcoal does not require to be put immediately in contact with

the sores, but is placed above the dressings, not unfrequently quilted loosely into a little cotton wool. In many cases patients whowere rapidly sinking have been restored to health.

In the instance of hospital gangrene, we have to deal not only with effluvia, but also with real miasmata; for, as is well known, the poisonous gases emitted by gangrenous sores not only affect the individual with whom the mischief has originated, but readily infect the perfectly healthy wounds of any individuals who may happen to be in its vicinity. So that in this way gangrene has been known to spread not only through one ward, but through several wards of the same hospital.

Within the last few weeks the dissecting room at St. Bartholomew's Hospital has been perfectly deodorized by means of a few trays filled with a thin layer of freshly heated wood charcoal. A similar arrangement will, in all probability, be likewise soon applied to the wards of St. Bartholomew's, and every other well-conducted hospital.

From these and other considerations, therefore, I feel perfectly confident that charcoal will prove by far the cheapest and best disinfectant.

Unlike many other disinfectants, it evolves no disagreeable vapors, and if heated in close vessels, will always act, however long it has been in use, quite as effectively as at first.

If our soldiers and sailors, therefore, when placed in unhealthy situations, were furnished with charcoal respirators, such as the second form above described, and if the floors of the tents and the lower decks of ships were covered by a thin layer of freshly burnt wood charcoal, I think we could have little in future to apprehend from the ravages of cholera, yellow fever, and similar diseases by which our forces have of late been decimated. If found more convenient, the charcoal powder might be covered with coarse canvas, without its disinfectant properties being materially impaired.

The efficiency of the charcoal may be greatly increased by making it red-hot before using it. This can easily be done by heating it in an iron saucepan covered by an iron lid.

When the charcoal is to be applied to inflammable substances, such as wooden floors, &c., of course it must be allowed to cool in close vessels before being used.

[Two or three additional sentences have been added, but all the rest of the Letter remains exactly as it appeared in the *Times* of the 22d November last.]—*Lond. Pharm. Jour. Jan.* 1855.*

ON THE METHOD OF EXHIBITING OPIUM AND ACETATE OF LEAD IN CHOLERA.

By M. Donovan, Esq., M.R.I.A.

"Homines ad deos nulla re proprius accedunt quam salutem hominibus dando."—Cicero.

The combination of opium and acetate of lead has been recommended as the best remedy in cholera by one section of the faculty; by another its efficacy has been doubted or denied; and by a third it has in some forms of the disease been considered noxious. On this question I shall be silent; but as the combination has been much employed, I shall offer some suggestions relative to the mode of exhibition.

It is for the consideration of the physician, in the first place, is the form of pill the most advantageous for the patient? We know the rapid progress of cholera; a few hours are often sufficient to bring the tragedy to its final catastrophe. Time is, therefore, of the greatest value; and not an avoidable moment should be lost. Opium and acetate of lead are generally made into pills by means of mucilage of gum arabic; for it is known that vegetable extracts decompose the acetate. But pills made with mucilage when dry become exceedingly hard, as will appear from the following experiment:—I charged a pistol with fifteen grains of gunpowder, and over the wadding introduced twenty pills, such as I have alluded to. I used as a target a hat-box, the top and bottom of which consisted of deal laminæ, each about one-twelfth of an inch thick. On discharging the pistol, the pills passed through the top and bottom of the box, and even made some impression on the plastered wall behind. Each pill

[*Owing to the publication of a notice of the views of Dr. Stenhouse in the 26th volume of this Journal, some of our readers may deem this as superfluous, but the importance of the subject is our only apology.—Ed. Am. Jour. Pharm.]

consisted of two grains of acetate of lead and a quarter of a grain of opium made into a mass with mucilage; they were allowed to dry in the air. Such pills required more than an hour to soften in water, and they were then far from being dissolved.

These facts are unfavorable to the choice of pills as a form calculated for the emergencies of cholera. But it may be objected against the liquid form, that the stomach will not retain the remedy in that state. If the stomach will not endure a teaspoonful of a liquid, it is probable that it will not retain anything; frequent repetitions of the dose, although each may be rejected, will amount at least to the continued action of one retained dose. If these arguments fail to convince, it will probably be conceded that if pills are to be used, they should be made immediately before they are wanted, and as soft as is consistent with retaining their shape; in a few hours they will become hard. A very small bolus were still better.

We have now to consider whether the combination of opium and acetate of lead is not open to a chemical objection which ought to have some influence with the practitioner. Opium consists of a variety of substances; thirteen at least are known—viz., morphia, codeine, narcotine, thebaine, pseudomorphine, porphyroxine, narceine, papaverine, meconine, caoutchouc, coloring matter, sulphates, and meconic acid. The two last, especially, and some of the others, decompose acetate of lead. The sulphate and meconate of lead, and some of the other compounds thus produced, are insoluble. Insolubility is a great obstacle to the exertion of medicinal power; morphia in its uncombined state is scarcely soluble, and hence is comparatively inactive; but every one knows how different the case is when it is rendered soluble by combination with an acid. Sulphate of barytes is insoluble and inert; but the soluble salts of barytes are poisons. It is therefore probable that the insoluble compounds formed in the case of opium and acetate of lead possess activity in a very inferior degree. Would it not be preferable to use a formula in which all the active ingredients are allowed to act with full energy? A mixture of solution of acetate of lead with solution of acetate of morphia undergoes no decomposition, and both salts would act without any diminution of power.

But acetate of morphia is not the representative of opium; beside morphia, opium contains codeine, an efficient sedative and hypnotic. Codeine exerts a specific action on the semilunar ganglion and solar plexus which supplies the intestinal canal, and on the branches of the great sympathetic, which, with so many others, supplies the stomach. In its pure state codeine is much less active than when combined with an acid. It should therefore be employed in the state of an acetate; for this salt does not decompose acetate of lead; the dose may be an eighth of a grain, repeated at intervals.

Dr. Gregory's hydrochlorate of morphia-and-codeine would be an admirable sedative with acetate of lead but for the production on mixture of the difficulty soluble chloride of lead.

But it is said that acetate of morphia is sometimes of uncertain effect, on account of the spontaneous evolution of a portion of its acetic acid, and even its partial decomposition by water. To obviate this loss of power, if such take place, some free acetic acid should be added to the mixture. Such addition is also advisable on another account; acetate of lead sometimes contains carbonate of lead, and this is believed to be the most noxious portion of the salt; but the carbonate cannot exist in presence of acetic acid. Little fear need be entertained about the action of acetate of lead thus purified: Sir Henry Marsh informs me that he has frequently given twelve grains in the day in three-grain doses, and never could perceive any ill effect; larger doses have been reported by others.

The following will afford a liquid representative of opium and acetate of lead:—

Take of

Acetate of lead	Two grains.
Acetate of morphia . . .	One-twelfth of a grain.
Acetate of codeine . . .	One-eighth of a grain.
Distilled vinegar	Half a drachm.
Distilled water.	One drachm.

Mix for a draught. Such draughts commence their action as soon as swallowed; they may be repeated at proper intervals; or immediately, if rejected from the stomach.—*Annals of Pharmacy*, Dec. 1854.

IMPROVEMENTS IN THE COMPOSITION OF PAINT.

By Mr. C. Binks.

In the manufacture of these improved compositions of paints, Mr. Binks forms in the first place what are called and are well known as insoluble soaps; that is, combinations of certain earthy and metallic oxides with oils or fatty matters, which combinations, having a general composition chemically analogous to common soaps, but being insoluble in *water*, are hence called insoluble soaps, in contradistinction to the compounds or soaps that result from the union of fatty matters with oxides of the alkaline metals.

These so-called insoluble soaps he dissolves in spirits of turpentine, or in naphtha, or other volatile solvent, and employs the resulting solutions as substitutes for linseed or other drying oils, in the manufacture of paints.

Any pigment (as, for example, white lead, oxide of zinc, lampblack, or any other,) he grinds in a solution (in turpentine or other volatile solvent) of the insoluble soap; and the resulting mixture or paint so produced, on being used as paint in the usual manner, has the property of drying with great rapidity, and of forming in all respects, as in color, body, compactness, durability, and other essential properties, an excellent and superior composition as paint.

Secondly, he adds glycerin to ordinary paints, or uses and applies glycerin as part of the composition of paints. To paints composed of the usual materials—as, for example, of some pigment ground in linseed oil—he adds glycerin in order to thin or prepare the paint for use, and to act as a substitute for linseed or other oil, or for turpentine, &c., commonly employed to thin paints for use; or he grinds the pigment in glycerin, or in a mixture of drying oil and glycerin, and thins the paint so produced with glycerin for use, or with a mixture of glycerin and some drying oil. The advantages of this application of glycerin consists chiefly in its being inodorous, in its cheapness (being at present a waste product of processes used for saponifying fatty matters), and in its property of giving a fine gloss to any paint it is added to.—*Annals of Pharmacy*, Dec. 1854.

Varieties.

On Perfumery. By Septimus Piesse.

(Continued from page 82.)

BOQUETS AND NOSEGAYS.

In the previous articles we have endeavored to explain the mode of preparing the primitive perfumes—the original odors of plants. It will have been observed that while the majority can be obtained under the form of otto or essential oil, that there are others which hitherto have not been isolated, but exist only in solution in alcohol, or in a fatty body. Of the latter are included all that are most prized, with the exception of otto of rose—that diamond among the odoriferous gems. Practically, we have no essential oils of jessamine, vanilla, tuberose, cassie (black currants), violets, and others. What we know of these odors is derived from esprits, obtained from oils or fats, in which the several flowers have been repeatedly infused, and afterwards infusing such fats or oils in alcohol. Undoubtedly, these odors are the most generally pleasing, while those made from the essential oils, dissolved in spirit, are of a secondary character. The simple odors, when isolated, are called Essential Oils, or Ottos; when dissolved or existing in solution in alcohol, by the English they are termed Essences, and by the French Extraits, or Esprits; a few exceptions prove this rule. Essential oil of orange peel, and of lemon peel, are frequently termed in the trade "Essence" of orange and "Essence" of lemons, instead of essential oil or otto of lemons, &c. The sooner the correct nomenclature is used in perfumery, as well as in the allied arts, the better, and the less blunders will be made in the dispensatory. It appears to the writer, that if the nomenclature of these substances was revised, it would be serviceable; he would suggest, as a significant, a brief and comprehensive adjective, Otto, be used as a prefix to denote that such and such a body was the odoriferous principle of the plant. We should then have otto of lavender instead of essential oil of lavender, &c., &c. Where there exists a solution of an essential oil in a fat oil, the necessity of some such significant distinction is rendered obvious, for commercially such articles are still called "oils"—oil of jasmin, oil of roses, &c. It cannot be expected that the public will use the words "fat" oil and "essential" oil, to distinguish these differences of composition.

There are several good reasons why the odoriferous principle of plants should not be denominated oils. In the first place, it is a bad principle to name any class of substances with the same signification as those belonging to another. Surely, there are enough distinguishing qualities in their composition, their physical character and chemical reaction, to warrant a sig-

nificant name to that large class of substances known as the aroma of plants!

When the chemical nomenclature was last revised, the organic bodies were little dealt with. We know that we owe this universal "oil" to the old alchemist, much in the same way as "spirit" has been used, but a little consideration about the matter quickly indicates the folly of its continued use. We can no longer call otto of rosemary, or otto of nutmegs, essential oil of rosemary or nutmegs, with any more propriety than we can term sulphuric acid "oil" of vitriol. All the chemical works speak of the odoriferous bodies as "essential" or "volatile" oils, and of the greasy bodies as "fat" or "unctuous" oils. Oils, properly so called, unite with salifiable bases, and form soap; whereas, the essential or volatile oils, *i. e.*, what we would please to call the ottos, do no such thing. On the contrary, they unite with acids in the majority of instances.

The word oil must hereafter be confined to those bodies to which its literal meaning refers—fat, unctuous, inodorous (when pure), greasy substances—and can no longer be applied to those odoriferous materials which possess qualities diametrically opposite to oil. We have grappled with "spirit," and fixed its meaning in a chemical sense; we have no longer "spirit" of salt, or "spirit" of hartshorn. Let us no longer have almond oil "essential," almond oil "unctuous," and the like.

It remains only for us to complete the branch of perfumery which relates to odors for the handkerchief, by giving the formulæ for preparing the most favorite "boquets" and "nosegays." These, as before stated, are but mixtures of the simple ottos in spirit, which, properly blended, produce an agreeable and characteristic odor, an effect upon the smelling nerve similar to the mixture that harmonious sounds produce upon the nerve of hearing, that of pleasure.

Bouquet D'Amour.

Esprit de rose " jasmin " violette " cassie	from pomade	of each . .	1 pint.
Extract of musk " ambergris		of each .	½ pint.

Mix and filter.

Bouquet des Fleurs du Val d'Andorre.

Extrait de jasmin " rose " violette " tuberose	from pomade,	of each .	1 pint.
Extract of orris			1 pint.
Otto of geranium			¼ oz.

Buckingham Palace Bouquet.

Extrait de fleur d'orange " cassie " jasmin " rose	from pomade,	of each	1 pint.
Extract of orris " ambergris	of each	. . .	½ pint.
Otto of neroly		. . . . .	½ drachm.
" lavender		. . . . .	½ drachm.
" rose		. . . . .	1 drachm.

Bouquet de Caroline; also called Bouquet des Delices.

Extrait de rose " violette " tuberose	from pomade,	of each	. 1 pint.
Extract of orris " ambergris	of each	. . .	½ pint.
Otto of bergamot " Limette " cedrat	of each	. . .	¼ oz.

The Court Nosegay.

Extrait de rose " violette " jasmin	of each	. . .	1 pint.
Esprit de rose triple		. . . .	1 pint.
Extract of musk " ambergris	of each	. . .	1 oz.
Otto of lemon " bergamot	of each	. . .	½ oz.
" neroly		. . . . .	1 drachm.

Eau de Chypre.

This is an old-fashioned French perfume, presumed to be derived from the *Cyperus esculentus* by some, and by others to be so named after the Island of Cyprus; the article sold, however, is made thus—

Extract of musk		. . . . .	1 pint.
" ambergris " vanilla " tonquin bean " orris	of each	. . .	½ pint.
Esprit de rose triple		. . . .	2 pints.

The mixture thus formed is one of the most lasting odors that can be made.

ESTERHAZY BOUQUET.

Extrait de fleur d'orange (from pomade)		1 pint.
Esprit de rose triple		1 pint.
Extract of vitivert, " vanilla, " orris, " tonquin	of each	1 pint.
Esprit de neroly		1 pint.
Extract of ambergris		½ pint.
Otto of santal		½ drachm.
" cloves		½ drachm.

Notwithstanding the complex mixture here given, it is due to the vitivert that gives this boquet its peculiar character. Few perfumes have excited greater *furor* while in fashion.

ESS BOUQUET.

The reputation of this perfume has given rise to numerous imitations of the original article, more particularly on the continent. In many of the shops in Germany and in France will be seen bottles labelled in close imitation of those sent out by Bayley and Co., Cockspur street, London, who are, in truth, the original makers.

Esprit de rose triple	1 pint.
Extract of vanilla	2 oz.
" orris	8 oz.
Otto of lemons	¼ oz.
" bergamot	1 oz.

The name "ess" bouquet, which appears to puzzle some folks, is but a mere contraction of "essence" of bouquet.

EAU DE COLOGNE. (*Le Premier qualitie.*)

Spirit (from grape), 60 over proof	6 gallons.
Otto of neroly, *Petale*	3 oz.
" " *Biggarade*	1 oz.
" rosemary	2 oz.
" orange peel	5 oz.
" citron peel	5 oz.
" bergamot peel	2 oz.

Mix with agitation; then allow it to stand for a few days perfectly quiet, before bottling.

EAU DE COLOGNE. (*Le Deuxième qualitie.*)

Spirit (from corn)		6 gallons.
Otto of neroly, *Petit-grain*		2 oz.
" " *Petale*		½ oz.
" rosemary		2 oz.
" orange peel, " lemon, " bergamot	each	4 oz.

Although eau de Cologne was originally introduced to the public as a sort of "cure-all," a regular "elixir of life;" it now takes its place not as a pharmaceutical product, but among perfumery. Of its remedial qualities we can say nothing, such matter being irrelevant to the purport of these articles. Considered, however, as a perfume, with the public taste it ranks very high; and although it is exceedingly volatile and evanescent, yet it has that excellent quality which is called "refreshing." Whether this be due to the rosemary or to the spirit we cannot say, but think something may be attributed to both. One important thing relating to eau de Cologne must not, however, pass unnoticed, and that is, the quality of the spirit used in its manufacture. The utter impossibility of making brandy with English spirit in any way to resemble the real Cognac, is well known. It is equally impossible to make eau de Cologne with English spirit, to resemble the original article. To speak of the "purity" of French spirit, or of the "impurity" of English spirit, is equally absurd. The fact is, that spirit derived from grapes, and spirit obtained from corn, have each so distinct and characteristic an aroma, that the one cannot be mistaken for the other. The odor of grape spirit is said to be due to the œanthic ether which it contains. The English spirit, on the other hand, owes its odor to fusel oil. So powerful is the œanthic ether in the French spirit, that notwithstanding the addition to it of such intensely odoriferous substances as the ottos of neroly, rosemary, and others, it still gives a characteristic perfume to the products made containing it, and hence the difficulty of preparing eau de Cologne with any spirit destitute of this substance.

Although very fine eau de Cologne is often made by merely mixing the ingredients as indicated in the recipe as above, yet it is better, first, to mix all the citrine ottos with spirit, and then to distil the mixture, afterwards adding to the distillate the rosemary and nerolics, such process being the one adopted by the most popular house at Cologne.

A great many forms for the manufacture of eau de Cologne have been published, the authors of some of the recipes evidently having no knowledge, in a practical sense, of what they were putting by theory to paper; other venturers, to show their lore, have searched out all the aromatics of "Lindley's Botany," and would persuade us to use absinthe, hyssop, anise, juniper, marjoram, caraway, fennel, cumin, cardamom, cinnamon, nutmeg, serpolet, angelica, cloves, lavender, camphor, balm, peppermint, galanga, lemon, thyme, &c., &c., &c.

All these, however, are but hum——! Where it is a mere matter of profit, and the formula that we have given is too expensive to produce the article required, it is better to dilute the said Cologne with a weak spirit, or with rose water, rather than otherwise alter its form; because, although weak, the true aroma of the original article is retained.

The recipe of the second quality of eau de Cologne is given, to show that a very decent aticle can be produced with English spirit.

BOUQUET DE FLORA; otherwise, EXTRACT OF FLOWERS.

Esprit de rose	from pomade, of each	1 pint.
" tubereuse		
" violette		
Extract of benzoin		1½ oz.
Otto of bergamot		2 oz.
" lemon, " orange	each	½ oz.

THE GUARD'S BOUQUET.

Esprit de rose	2 pints.
" neroly	½ pint.
Extract of vanilla	2 oz.
" orris	2 oz.
" musk	½ pint.
Otto of cloves	½ drachm.

FLEUR D'ITALIE; or, ITALIAN NOSEGAY.

Esprit de rose, from pomade	2 pints.
" rose triple	1 pint.
" jasmin, " violette — from pomade, each	1 pint.
Extract of cassie	½ pint.
" musk, " ambergris — each	2 oz.

JOCKEY CLUB BOUQUET. (*English formula.*)

Extract of orris root	2 pints.
Esprit de rose triple	1 pint.
" rose de pomade	1 pint.
Extrait de cassie, " tubereuse — de pomade, each	½ pint.
" ambergris	½ pint.
Otto of bergamot	½ oz.

JOCKEY CLUB BOUQUET. (*French formula.*)

Esprit de rose, de pomade	1 pint.
" tubereuse "	1 pint.
" cassie "	½ pint.
" jasmin "	¼ pint.
Extract of civet "	3 oz.

Independent of the materials employed being different to the original English recipe, it must be remembered that all the French perfumes are made of brandy, *i. e.*, grape spirit; whereas the English perfumes are made with corn spirit, which alone modifies their odor. Though good for some, yet for others the grape spirit is very objectionable, on account of the predominance of its own aroma.—*Annals of Pharmacy, April,* 1854.

A new Sugar Plant.—The scarcity of corn in France has drawn attention to a new plant recently introduced from China, which promises to supercede, to a certain extent, the use of beet root in the manufacture of sugar and the distillation of alcohol. The Agricultural Committee of Toulon has recently addressed a report to the Minister of War, with respect to the use of the plant in question. It is called the *sorgho* or *holcas saccharatus*, and was first introduced into France in 1851 by M. de Montigny, the French Consul in China, who sent some grains of the seed to the Government. Since then the culture of the plant has been commenced with success in Provence, and promises to be of great advantage to Algeria. The *sorgho* has been called the "sugar cane of the North of China," and numerous experiments have recently been tried with a view to ascertaining if it possesses the properties necessary for producing a crystallizable syrup, so as to become a rival to sugar cane and beet-root. According to the report of the Toulon Agricultural Association, it would appear to have those properties. The fact has been ascertained by a series of experiments made in the department of the Var. It also appears to be richer in saccharine principle than any known plant, except the vine. Beet-root contains from eight to ten per cent. of sugar; the *sorgho* produces from sixteen to twenty per cent. from which eight or ten per cent. of pure alcohol, fit for all industrial and domestic purposes, can be produced. The refuse is excellent food for cattle, who are very fond of it. The plant grows with great rapidity, and does not require irrigation. The *sorgho* is not a new discovery, as it has been used from time immemorial by the inhabitants of the north of China, by whom large quantities of sugar is extracted from it. But this is the first time it has been produced on anything like an extensive scale in Europe.—*English paper.*

Serpents' Bite and other Poisoned Wounds.—Dr. Brainard, of Chicago, in an interesting essay on "treating Serpent bite and other poisoned wounds," concludes with the following observations:—

The result of my experiments, taken in connection with those made by others, is, that up to the present time, no substance or solution has been found capable of preventing the fatal effects of the rattlesnake bite (unless destroying by caustic or excising the tissues of the part) excepting the solution of iodine. This, within certain limits, is capable of neutralizing it.

In order to guard against error, it should be stated that, in experimenting with birds, the separation of skin by injecting even distilled water and applying cupping-glasses, is liable to cause the skin to fall off in scales. When the skin is not extensively separated, the solution recommended does not produce an eschar. The effects of iodine solutions on the tissues, since the publication of Velpeau's work on the subject, are so well understood that it is unnecessary to dwell further on this point.

The effect of solutions of iodine, infiltrated into the tissues around the bite of the rattlesnake, is to prevent their discoloration and preserve the natural texture and color of the parts. Even when it does not prevent death from occurring, it still has this effect in a great degree.

The deductions which I think may legitimately be made from the foregoing facts, are—

1. The venom of the crotalus produces spasm of all the muscles—most marked in the muscles of respiration.

2d. This venom produces a peculiar change of the blood globules which consist of alteration of form and disintegration.

3. If death is delayed, it deprives the blood of its fibrine.

4. The solution of iodine and iodide of potassium, in the proportion of ten grains of the former and thirty of the latter to the ounce of distilled water, is, within certain limits, an antidote to the venom of the rattlesnake.

5. When the venom is deeply inserted, or when it has been absorbed, the antidote, to be effectual, must be infiltrated into the tissues.

6. This infiltration can be performed without causing loss of substance, or producing either eschar or suppuration.—*The Western Journal.*

Improvement in the Manufacture of Baker's Yeast. By M. C. Gutkind, of Paris.—The new method consists in completely saccharifying the starch contained in barley. The barley is slightly malted, dried in a rapid current of warm air, taking care to prevent smoke coming in contact with the grain. The malt thus prepared is reduced to the condition of the finest flour possible, without bolting it; that is the flour and bran should not be separated. This flour is introduced into a vat, the size of which varies according to the quantity of yeast intended to be prepared at each operation. Water at a temperature of 40° Centigrade (104° Fahr.) is introduced into the vat sufficient to make the flour into dough like that for making bread; this dough is then diluted with a farther quantity of water, at the same temperature, to the consistence of porridge. M. Gutkind prefers using, for every 100 killogrammes of flour (=220 48 lbs.), 2 hectolitres (=44 gallons) of warm water. When the porridge is made, it is introduced into a boiler, where it is gradually heated to 81° Centigrade (177.8 F.). As soon as it reaches this temperature, the fire or steam, whichever be employed is arrested, in order that the temperature of the porridge, become sensibly more fluid, may not pass that degree.

The liquid mass is now introduced into bags of canvas, and submitted to the action of a press, by which the essentially liquid portion, which is very saccharine, is squeezed out; this liquid is kept in large vats, where it cools. The solid matter remaining in the bags is again placed in a vat, and treated with a fresh quantity of water at 114 Fahr., in the proportion of 111 gallons of water to 441 lbs. of residue. The mixture is stirred so as to

form a porridge, which is re-introduced into the boiler, and heated to a temperature of 201° Fahr., at which it is maintained for one hour. The mass is then pressed as before in bags of coarse canvas; as it is rich in nitrogenous compounds, which form the base of the yeast. The liquors resulting from both operations are mixed together; and are exposed to the action of the air in large uncovered vats during two, three, and even for ten days, according to the external temperature.

This exposure to the air is one of the chief points in the new method. In order to set the liquid in fermentation, it is re-warmed to a temperature of 89 6° Fahr., and a small quantity of fresh yeast stirred up in a little warm water added. The fermentation sets in very soon, and may be conducted either in barrels or in vats, around which a temperature of 59° Fahr. should be maintained during the whole operation.

The yeast obtained by means of this process possesses the following properties:—

1. The *raising* power is much superior to that of all other yeast; 2. It has no bitter or acid taste, and consequently is admirably adapted for pastry work; and 3. It is of an extreme whiteness, and consequently does not require to be washed—hence it preserves all its force.

The residue remaining after the fermentation may be employed to make vinegar.—*Pharm. Journ. from Le Genie Industrial*, June, 1854.

Influence of Elevation of Soil on the Mortality from Cholera.—In the report on cholera in 1849, by the Registrar-General (see this Journal for Nov. 1853, p. 189, and for June, 1854, p. 100,) it is stated that the elevation of the soil in London has a more constant relation with the mortality from cholera than any other known element—the mortality being in the inverse ratio of the elevation; and so exactly has this been verified in the present epidemic, that a scale of premium might safely have been drawn out in 1849 to rule in 1854 to the following effect: For a person of average condition dwelling under 20 feet of elevation, the premium to insure 1,000*l.* would be 12*l.*; while for those living at from 100 to 350 feet elevation, the Life Office would be secure with 2*l.* premium. But the following facts worked out by the Registrar-General, show distinctly the inverse relation that the mortality of cholera bears to the elevation of the ground:—

182,560 of the people of London, in 1851, lived upon sub-districts covering 2,849 acres of the marsh ground, ranging from 3 feet below to 1 foot above the high-water mark; 2,693 died there of cholera in 1849, and 2,227 in 1854, or 4,920 in the two epidemics.

263,914 of the population, in sub-districts on 12,146 acres of ground of 80 feet of elevation and upwards, lost 398 persons by cholera in 1849, and 272 in 1854, or 670 in the two epidemics,

12,824 persons died of cholera in the two years 1849 and 1854 on the 18,429 acres of low ground under 10 feet of elevation, out of a population

of 595,119; while in the same years, out of the more numerous population, 682,795 persons, living on 21,909 acres of the higher ground of 60 feet and upwards, only 2,949 persons died of cholera, including all the deaths in the district of St. James.

On the lowest ground, taking the mean of the two epidemics, *thirteen* in 1,000 of the population—on the highest ground *one* in 1,000 of the population—were destroyed by cholera.

At the intermediate stages of elevation was the danger of dying by cholera intermediate? To solve this important question as regarded the epidemic of 1849, London, was first sub-divided into terraces differing 20 feet in elevation; and if the same course is pursued now, it is found that in the two epidemic years 15,562 persons died of cholera on the first terrace under 20 feet of elevation; 3,757 on the second terrace of ground, 20 and under 40 feet high; 2,301 on the third terrace, 40 and under 60 feet; 2,279 on the fourth terrace, 60 to 80 feet high; 392 on the fifth terrace, 80 to 100 feet; 278 on the higher terraces of 100 feet up to 350 feet. The population was 850,000 on the lowest terrace; and about equal, or 400,000, on the second, the third, and the fourth terraces; while it was 142,000 on the fifth, and 121,000 on the higher terrace or terraces.—*Medical News.*

Editorial Department.

American Pharmaceutical Association.—This body, at its last meeting in Cincinnati, adjourned to meet in New York city, on 2d Tuesday (11th) of September next. As the period is a favorable one for the business visits of our southern and western friends, we hope that they will try and make it convenient to attend the meeting, and give at least the countenance their presence will afford to a movement calculated greatly to benefit the entire pharmaceutical profession. It is suggested that as hereafter these meetings will have a more scientific cast, and be more interesting to all who may attend, it is to be hoped that each individual will bring a quota of information, statistical, scientific, or practically useful, and that the *proceedings* may embody these in a digest for the benefit of those not in attendance.

Cavendish Society.—Our readers who are interested in this society are requested to examine the advertisement in the appended sheet. We regret to learn that the first volumes of Lehmann's Physiological Chemistry are already *out of print*, and cannot be supplied to future subscribers. The agent announces the receipt of two new volumes for the subscribers, Bischof's Elements of Chemical and Physical Geology (vol. 1st.), and

Dr. Henry's life of Dalton. We hope to be able to notice these volumes in our next number.

Annals of Pharmacy and Practical Chemistry, London.—In the December number of this journal, the editors, who are also the proprietors, announce its discontinuance, owing to deficient patronage. The editorial course of this journal has been marked with extreme bitterness against the Council of the Pharmaceutical Society. Many of its articles against members of that body are filled with offensive personalities altogether unfitted for the pages of a scientific journal, and which, continued so pertinaciously as they have been, could not fail to react against their authors. It is to be regretted that the talents and energy displayed by the editors should be thus turned aside from the cause of science, and their journal, from which we have frequently derived articles of interest, should cease to exist.

New York Journal of Pharmacy.—We are informed by a gentleman of New York, that Mr. Charles Shields, the proprietor of the New York Journal of Pharmacy, has discontinued its publication, chiefly owing to the indifference manifested by the subscribers in not paying up their dues, as well as from lack of interest on the part of those who should feel a pride in supporting and encouraging it. Dr. Antisell, the late editor of the New York Journal, has, we understand, gone to Mexico on scientific business. Scientific Journalism is uphill work in this country, and unless it can be made to appear to be to the pecuniary interest of subscribers, a large number will give you the cold shoulder. We know of an instance of a druggist in good business, who was in the habit of *borrowing* our journal and extracting from it receipes and other practical items useful to him.

Pharmacy in Canada.—We learn from the *Montreal Medical Chronicle* for Jan. 1855, that a meeting of druggists' assistants and apprentices was held on the 17th of November, 1854, with a view to effecting an organization for mutual improvement in professional qualifications. The Society then formed was named the "Montreal Pharmaceutical Association," to preside over which the following gentlemen were elected as officers for one year, viz., Johnston Beer, *President*; Richard Jenner, *Vice President*; Charles Vanfelson, *Secretary*, and Kenneth Campbell, *Treasurer*.

This movement is a favorable indication of the progress of the reform which is now actively operating in Great Britain. The pharmaceutists themselves should follow the example of their subordinates, and establish a pharmaceutical society analogous to the several branches of the London Society at Liverpool, Manchester, Edinburg, etc., which would give a great impetus to Canadian pharmacy.

PHARMACY IN NEW YORK.—After carefully reading over the following anonymous article, which originally appeared in the *New York Daily Times*, we are at a loss to decide whether it was written by a dissatisfied drug clerk, or a critically disposed physician, for there is too much knowledge displayed to attribute it to an uninitiated person, at the same time that there are several points which indicate a want of information hardly attributable to a regular pharmaceutist, and we should think no well disposed member of the fraternity would use the columns of a newspaper to discuss the subject, however deserving of exposure, in the manner it has been done in the *Times*. The story about jalap is rather fishy, as the substitute is far milder than the article directed, and has less tendency to produce delirium than the quinine that preceded it. The statement in the seventh paragraph about the influx of spurious drugs into New York will hardly be admitted by Dr. Bailey as applying to the Custom House, and perhaps relates more to past times than the present—unless there is some "underground railroad" sort of way of introducing them. In alluding to the remedy, the writer in recommending an examination of the apothecaries makes no allusion to the New York College of Pharmacy, which has long been employing its influence for good in that direction. There is so much truth in some of the statements, when applied to this city, that we give the article a place for the benefit of those concerned, both medical and pharmaceutical.

Startling Abuses in the Retail Drug Trade.—The Remedy.—There is no business whatever in which the public ought to feel more interest, and to which they pay less attention, than the retail drug trade. If a man wants a dose of medicine, he thinks it sufficient if he get it out of some store with a projecting window with a big red and blue bottle in it. It never occurs to him to consider whether the druggist is acquainted with his business, and a judge of the quality of the medicine which he dispenses.

To qualify a man to keep a drug store, a thorough knowledge of Latin is requisite. He should know at least the rudiments of the Greek language, and be practically acquainted with Chemistry and Botany. He should have such an accurate acquaintance with medicine as to be able, at a glance, to detect impure and spurious drugs. How few of all those in the business are so qualified?

Too often, the drug business affords a refuge to those who have failed in other businesses. Men who "burst up" in dry goods have succeeded in drugs, and got rich on their little quackeries and nostrums. All these gentlemen stick M. D. to their names, and will "undertake" anything, from the manufacture of "refined liquorice" to the "embalming of the dead," whom they will warrant to keep until the general resurrection.

These pretenders foist off molasses and water as a blood-purifier, under the name of sarsaparilla. They are the sole inventors of some wonderful remedy for coughs and colds. Their cholera and colic mixture is quite infallible, while their venereal remedies, which they, delicately, style "vegetable elixirs," were never known to fail in effecting a speedy cure.

Many of these empirics have stores in the meaner districts of the city, and it is astonishing what sums they receive for their "advice" from the poor. They lie in wait for thoughtless sailors, and reckless California

passengers, and "screw out" of them large sums for medicines to protect them from the diseases and influences of any climate!

A great many drug-stores belong to physicians; but as it is considered *infra dig.* to be connected with a store, they usually carry on the "shop" under another name. In such cases they avail themselves of the services of some unfortunate foreigner, whose necessities compel him to accept of from $3 to $5 a week, the usual pay of drug-store clerks for seventeen hours' attendance daily for six days in the week, and nineteen hours on Saturday.

There is more ignorance or rascality displayed in the drug trade than in any other. The quantity of spurious drugs which is introduced daily into New York is immense. Besides, the adulterating of drugs is carried on as a regular business in this city. It is only a short time ago since an advertisement appeared in one of our contemporaries for upwards of a week "for a person acquainted with the adulteration of drugs." No doubt the advertiser had, to use a business phrase, "a host of applicants." The sale of these adulterated drugs proves one of two things: First, that the retail druggists, being ignorant of their business, buy these drugs as genuine of the wholesale houses; or that, being acquainted with their business, they buy them for the sake of the extra profit which such drugs will fetch. It is not uncommon for even "respectable" druggists to "palm off," at sixpence an ounce, common senna, which costs fifteen cents a pound, for Alexandria, which costs from seven to nine cents a pound extra. Three hundred per cent. profit would satisfy most traders, but the druggists go in for from four to five hundred per cent., and as much more as they can get, but inasmuch as much of their stock is perishable, and they are obliged to keep a large assortment for which there is very little call, this per centage is not as unfair as may at first seem.

From what we have said, some might suppose that the adulteration and imitation of drugs were confined exclusively to the wholesale trade. But such is not the case. Labels for French perfumery and for various patent medicines are to be had in all the wholesale stores, and are bought and used extensively by almost every retail store in the city.

Quack medicinces, for the sake of the one hundred per cent. profit which they yield, are sold by every retail store in the city; while the most simple analysis or synthesis would show that they are not only deleterious but positively poisonous.

One, who was a farm laborer, then a horse-jockey, and now is self-styled an M. D., who has a store and manufactory a few miles from town, and a 'desk" in an office in the city, informed us some time ago of the ingredients of one of his nostrums, which is regularly advertised as "one of the blessings of the age," and asked our opinion of it. On our expressing our surprise at his daring to sell such stuff, he admitted that the "blessing was a leetle strong," and that on being *dared* to drink a twenty-five cent bottle of it, he nearly killed himself, although he vomited the whole in half an hour after taking it.

As the imitation and adulteration of drugs is not confined to the wholesale houses, neither are all the other rascalities in the business to be laid at their doors.

Our readers cannot fail to have noticed the great number of drug-stores which are daily advertised for sale in all parts of the city. The preparing and stocking of these stores for sale is carried on as a regular business. An old mechanic or bankrupt dry goods man has sometimes two stores "doing an excellent family business, in most desirable localities," for sale. Before the stores are advertised, a complete supply of tinctures is made up—and such tinctures! The directions of all the dispensaries are

set at nought. The tinctures (!) are made up without regard to quality. Cheapness and profit are the only objects in view. A complete stock of the best imitation of genuine medicines is laid in, fictitious transactions are entered in the "Daily Cash Book," and the daily sales are increased by a convenient medical process. And now the store is ready for sale.

The ignorance of those in the drug business, and the negligence and carelessness of physicians, lead to innumerable mistakes, many of which prove fatal.

The United States, London, Edinburgh, and Dublin, publish each a *Dispensatory* or *Pharmacopœia*, for the guidance of apothecaries and physicians. Many of the names for the same drug are entirely different in each of these works. It might be supposed that our medical men would confine themselves in writing their prescriptions to the nomenclature of that very able work, the *United States Dispensatory*.

Such, however, is not the case. It would be difficult to say where many of them picked up their Latinity. It would astonish the men of a much later period than that of CÆSAR or CICERO.

We have recently had access to upwards of two thousand prescriptions. About fifteen hundred of them showed that the writers were entirely ignorant of the declensions to which the various nouns used belonged. Many of them were written in pencil, and almost illegible. If a medical man be applied to in bed for a prescription he may be excused for using a pencil, but in no other situation. Before a prescription reaches an apothecary, it is, not uncommonly, well creased and thumbed, and, if in pencil, next to illegible. No patient who is able to pay his physician should accept from him a prescription in pencil, or one which is indistinctly written. Such lead only to mistakes.

When an erroneous prescription is presented at a drug store, the prescription, if the druggist be ignorant of his business, is made up exactly as it is written. If the druggist knows the nature and qualify of medicines, the prescription should be sent to the physician to be corrected. But as no professional man likes to be convicted of an error, it is very seldom that he hears of his own mistakes. A conscientious apothecary informed us, that when he first commenced business, he made a practice of sending all erroneous prescriptions back, but as he invariably lost the custom of the medical men to whom these were sent, he changed his system and corrected the mistakes himself.

We are informed of a fatal mistake which occurred a few weeks ago. A prescription, in which there was a most unusual quantity of prussic acid, with three or four other ingredients, was ordered and left at a drug store. The clerk of the store hesitated to put up the prescription in the absence of his employer, and unwilling to lose a little custom, stated that it was necessary to send down town for one of the ingredients, and that the medicine would be ready in an hour or two. The patient was anxious for the medicine, and sent twice for it. He soon called a third time, and stated that if it was not ready, to give him the prescription, and his father would get the medicine elsewhere. The prescription was returned and made up by some one more ignorant or less scrupulous, and next day the lady was dead of a diseased heart! Diseased hearts cover a multitude of mistakes!

It frequently happens that some drug is ordered which is not in the store of the apothecary to whom the prescription is presented. In such a case, if he be an unscrupulous person, he substitutes some drug of what he considers a similar quality for the one in question. A case of this kind occurred some time ago in the practice of an acquaintance. He was attend-

ing an engineer of a Southern steamer, who was suffering severely from fever and ague. After giving very powerful doses of quinine, the physician ordered podophyllin. The prescription was taken to a drug store in the vicinity of the wharf at which the steamer was lying, and the proprietor having no such medicine, supplied jalap in its stead. Next morning the patient was raving mad, and had to be transferred to the City Hospital, and lost his berth on board of the steamer. When the physician called next day at the drug store to examine the podophyllin, he was so astonished at its effects, he was informed by the apothecary that his clerk had not much experience, and had used the one medicine for the other!

Numerous mistakes occur in stores which frequently change owners. Drugs, in such stores, are put into jars, bottles, and drawers, with names applicable to other medicines. This, too, is frequently done, as some unprincipled druggists say, to test the ability and knowledge of their clerks. It is nothing uncommon to see a whole "nest of drawers" without a single label on them.

A narrow escape from culpable carelessness of this kind occurred in a well-frequented drug store which recently changed proprietors. The clerk's account of the mistake was that, when busy in making up a long *minim* prescription, a girl entered the store crying, and asked for three cents' worth of a medicine very little used. A jar, on which were a gilt and a paper label—the latter intending to intimate that it bore the name of the medicine it then contained, which was that asked for—was hurriedly taken down for the first time that the clerk had been in the store, and the girl was served out of "her turn." Most providentially, the physician was waiting beside his patient, a child, to administer the medicine, when he discovered that a drug had been sent which would have destroyed life, with great agonies, in a few minutes. So much for false labels!

If medical men were aware of the absolute trash which is sold for medicine, they would be careful in recommending particular stores. While many physicians accept of 25 per cent. on the amount of business which they send to the stores of their friends, such recommendations will be viewed with suspicion. They should abandon a percentage which, to say the least of it, is deserving of reprehension.

What then, you ask, is the remedy for this state of things? We answer —first, in so far as the public is concerned. Avoid all stores in which there is a continual change of clerks, and especially if you should be satisfied that they are not receiving more than $5 a week. No competent person, except in extreme distress, would accept of such a sum. Avoid all dirty stores; all stores, which, from a patch-work like appearance—jars of various sizes and of different patterns, with dissimilar labels—give evidence that they have changed hands repeatedly; all stores where everything is not carefully labelled; and where there is a total absence of anything like system. If you see one set of tinctures on one side of a store, and another set opposite; oils divided in the same manner; spirits, essences, and syrups ranged together, and roots, flowers and seeds jumbled together, and other things in similar confusion;—though you know nothing of medicine, you may be assured that there is neither method nor system in such a store.

Secondly, in so far as the trade is concerned. There are a *few* well educated and thoroughly bred druggists in the city. Let them unite and appoint, for their examination, the very best professors they can obtain in Latin, Chemistry, Botany, and Materia Medica. Let these druggists submit to a searching examination, and obtain a diploma of their qualifications. Such diplomas, by giving the public confidence in their abilities,

will increase their business, and leave their uneducated brethren to the neglect they merit.

There is another plan which might be adopted by the public for its safety and satisfaction, but to it we cannot allude in this article."—*American Medical Monthly from The New York Daily Times.*

PEIRCE PIERCED, OR POLITICS VS. SCIENCE.—From a cotemporary we learn that Dr. Peirce, Examiner of Drugs at the port of Boston—and author of a work on the adulteration of drugs, etc., having, in the opinion of the Secretary of the Treasury, had sufficient opportunity to learn the business of inspecting drugs has been graciously permitted to discontinue his service to the government, that Dr. Joseph H. Smith, of Dover, New Hampshire, may have a chance to acquire some knowledge of the art and mystery of drug-judging, before his friend, the President, ceases to be controller general. The Honorable Secretary is evidently afraid that his agents will become too acute at detecting adulterations, and injure the revenue by too strict an interpretation of the law, to avoid which, he brings into office physicians from the interior, where the opportunity for making acquaintance with pharmacology and chemistry is necessarily limited.

When the inspectorships of flour, whiskey, bark, etc., are filled with persons ludicrously unfitted for their duties, we can smile and pass on; but when the purity of the drug market is to be periled, that political partizans may be rewarded, it would be criminal to remain quiet.

Outlines of Chemical Analysis, prepared for the Chemical Laboratory of Giessen. By DR. HEINRICH WILL, Professor of Experimental Chemistry in the University of Giessen. *Translated from the third German Edition,* by DANIEL BREED, M.D., of the U. S. Patent Office, and LEWIS H. STEINER, M.A., M.D., Prof. of Chem. Nat. Med. College. Boston and Cambridge, James Monroe & Co., 1855, pp. 297, octavo.

The shortest way to a result that is reliable and accurate, and which does not infer too much pre-existent knowledge on the part of those for whose guidance it is offered, is certainly the one to be chosen for the student. A redundancy of directions and a multiplication of reagents beyond a clear indication of the identity of the objects sought, however important to the toxicological chemist in giving strength and force to an analysis in medico-legal evidence, should always be avoided in presenting practical chemistry to the student, as tending to confuse him. In this regard the teaching of the Geissen school, under the direction of Liebig, was conducted, and its success will not be questioned in view of the many eminent men who have derived their first practical lessons from its laboratory. The work, of which the title page is given above, was prepared at the suggestion of Liebig, by Dr. Will, who, from being his able assistant, has become his successor, since Leibig's translation to the Bavarian Capital, and it has received his unqualified approval. Although the first German edition of this work has already been rendered into English by Prof. Hoffman, of London, and an American edition of this issued under the auspices of Prof. Horsford, of Cambridge,

yet so many changes and improvements are found in the recent German edition that the translators, with the warm approval of the author, have believed a new translation to "be a grateful task, and one sure to benefit scientific research in this country."

In view of the incipient state of practical chemistry in the United States, as a branch of study, the translators have prefixed to the work an introductory chapter on the elements of chemical manipulation, illustrated by figures.

The *first part* is devoted to "the comportment of the metallic oxides and their salts;" the *second* to the comportment of the metalloids and their more important compounds;" the *third*, a "course of qualitative chemical analysis," accompanied by eleven valuable tables, exhibiting the behavior of the several classes of substances with reagents, and before the blow-pipe, so as greatly to facilitate instruction; and the *fourth part*, "outlines of quantitative analysis," is put in the form of forty-one practical examples in quantitative analysis, beginning with simple metallic salts, and successively presenting alloys, minerals, ashes, mineral waters, concludes with a series of organic bodies, and complex animal fluids, as milk and urine.

Of the translators it may be said that they are well qualified for the task. One of them, Dr. Breed, was a student of Leibig, and is favorably known by his discovery of bismethyle and by his translation of Lowig's Elements of Organic Chemistry, and in presenting this new translation they merit the thanks of every American student of analytical chemistry.

The publishers have done their part well; the sheets contain some typographical errors, the most of which have been pointed out in the appended list of corrections, although a few, as will always be the case, have passed unnoticed—for instance, at page 128, six lines from the bottom, the word "nitrogen" should read "oxygen." The TABLES are secured in with muslin strips, and are printed on thicker paper than the text.

Table of Urinary Deposits, with their Microscopical and Chemical Tests, for Clinical Examinations. By JOHN KING, M.D., Cincinnati, Ohio.

This chart is a compilation of the more important characters of healthy and pathological urine, with the appearances exhibited under the microscope of the several normal and abnormal constituents, illustrated by well executed wood cuts; and the usual chemical tests following. Succinct notices of the diseases indicated by the inordinate secretion of normal constituents, as well as those giving rise to the abnormal ingredients, are appended with their remedies. A table of the specific gravities of urine, in reference to the proportion of fluids and solids, and another of the color of different varieties of urine are given.

The whole appears to be carefully arranged, and will prove useful as a reference to the practitioner to refresh his memory, and materially aid the student in getting a clear idea of the subject.